COMPAQ

Maintenance and Service Guide

Compaq Evo N600c

Document Part Number: 235393-001

August 2001

This guide is a troubleshooting reference used for maintaining and servicing the notebook. It provides comprehensive information on identifying computer features, components, and spare parts, troubleshooting computer problems, and performing computer disassembly procedures.

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Maintenance and Service Guide
First Edition August 2001
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1

Product Description

The Compaq Evo N600c Series of Personal Computers offers advanced modularity, Mobile Intel Pentium III processors-M with 64-bit architecture, industry-leading Accelerated Graphics Port (AGP) implementation, and extensive multimedia support.



Figure 1-1. Compaq Evo N600c

1.1 Features

- Mobile Intel Pentium III processor 1.066 GHz-M or 866MHz-M, with 512-KB integrated L2 cache, varying by computer model

- ATI Mobility Radeon with 64-bit video graphics, 16-MB double date rate (DDR) SDRAM, 4X AGP graphics card
- 128-MB high-performance Synchronous DRAM (SDRAM), expandable to 1024 MB
- Microsoft Windows 98, Windows NT 4.0, or Windows 2000 preinstalled, varying by computer model
- 14.1-inch, XGA, TFT (1024 × 768) display, with over 16.7 million colors
- Full-size TouchPad or pointing stick keyboard, varying by computer model
- Mini PCI 10/100 network interface card (NIC) or Mini PCI V.90 modem plus 10/100 NIC combination card, varying by computer model
- Support for two Type II PC Card slots with support for both 32-bit CardBus and 16-bit PC Cards
- External AC adapter with power cord
- 8-cell Lithium ion (Li ion) battery pack
- 30-, 20-, or 15-GB high-capacity hard drive

- Connectors for:
  - RJ-11 modem
  - Mono microphone
  - Stereo line-out/headphone
  - MultiPort
  - Universal Serial Bus
  - Docking
  - Parallel devices
  - Serial devices
  - Composite TV
  - External keyboard/mouse
  - RJ-45 network
  - External monitor
  - AC power
- Stereo speakers providing Compaq *Premier·Sound*™ 16-bit stereo sound

1.2 Clearing a Password

If the notebook you are servicing has an unknown password, follow these steps to clear the password. These steps also clear CMOS.

1. Prepare the computer for disassembly (refer to Section 5.3, "Preparing the Computer for Disassembly," for more information).
2. Remove the RTC battery (refer to Section 5.7, "Real Time Clock (RTC) Battery").
3. Wait approximately five minutes.
4. Replace the RTC battery and reassemble the computer.
5. Connect AC power to the computer. Do **not** reinsert any battery packs at this time.
6. Turn on the computer.

All passwords and all CMOS settings have been cleared.

1.3 Power Management

The computer comes with power management features that extend battery operating time and conserve power. The computer supports the following power management features:

- Standby
- Hibernation
- Setting customization by the user
- Hotkeys for setting level of performance
- Smart battery that provides an accurate battery power gauge
- Battery calibration
- Lid switch suspend/resume
- Power/suspend button
- Advanced Configuration and Power Management (ACP) compliance

1.4 Computer External Components

The external components on the front and right side of the computer are shown in Figure 1-2 and described in Table 1-2.

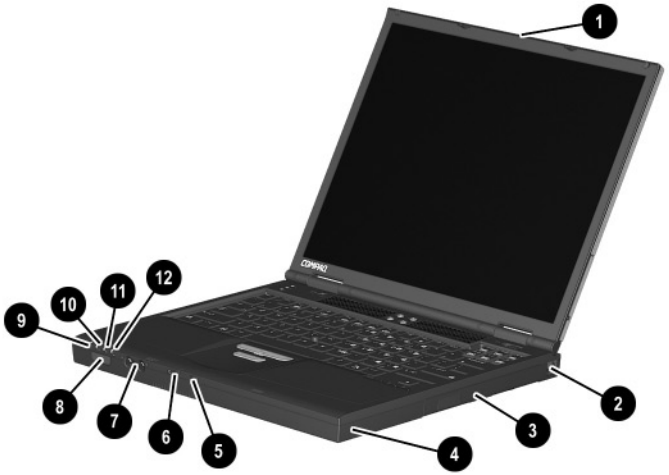


Figure 1-2. Front and Right Side Components

Table 1-2
Front and Right Side Panel Components

Item	Component	Function
1	Display release latch	Opens the computer.
2	RJ-11 jack (internal modem models only)	Connects the modem cable to an internal modem. A modem cable is included with internal modem models.
3	MultiBay	Accepts a diskette drive, CD- or DVD-ROM drive, or secondary battery pack.

Table 1-2
Front and Right Side Panel Components *(Continued)*

Item	Component	Function
4	Security cable slot	Attaches an optional security cable to the computer.
5	Mono microphone jack	Connects a mono microphone, disabling the built-in microphone.
6	Stereo line-out/ headphone jack	Connects stereo speakers, headphones, headset, or television audio.
7	Volume control buttons	Adjust the volume of the stereo speakers.
8	Infrared port	Links to another IrDA-compliant device for wireless communication.
9	Power light	On: Power is turned on. Blinking: Computer is in Standby. The power light also blinks if a battery pack that is the only available power source reaches a low-battery condition.
10	Battery light	On: A battery pack is charging. Blinking: A battery pack that is the only available power source has reached a low-battery condition.
11	Drive activity light	Turns on when the hard drive, CD-, or DVD-ROM drive is accessed.
12	Diskette drive light	Turns on when the diskette drive in the Media Bay or the optional external diskette drive is accessed.

The computer right side and rear panel components are shown in Figure 1-3 and described in Table 1-3.

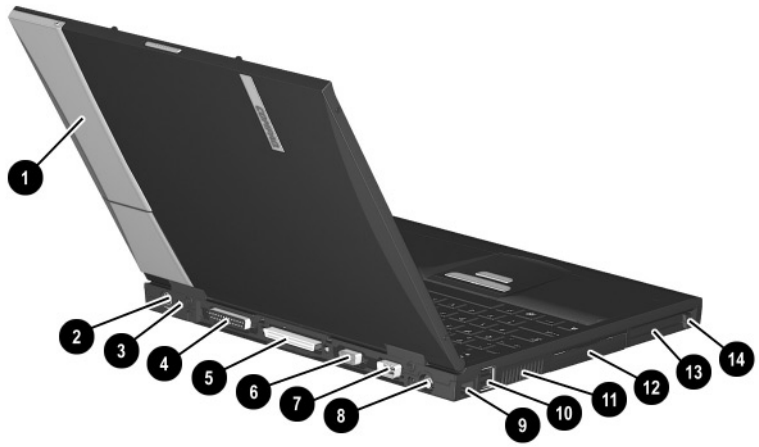


Figure 1-3. Right Side and Rear Panel Components

Table 1-3
Right Side and Rear Panel Components

Item	Component	Function
1	MultiPort	Connects wireless communication devices, such as a Bluetooth or 802.11b MultiPort Module, and other options.
2	DC power jack	Connects any one of the following: ■ AC adapter ■ Optional automobile power adapter/charger ■ Optional aircraft power adapter
3	Keyboard/mouse connector	Connects an external keyboard or PS/2-compatible external mouse. To connect a keyboard and a mouse at the same time, use an optional Y-adapter.

Table 1-3
Right Side and Rear Panel Components *(Continued)*

Item	Component	Function
4	Parallel connector	Connects a parallel device.
5	Docking connector	Connects the computer to the optional expansion base, convenience base, or port replicator.
6	Serial connector	Connects a serial device.
7	External monitor connector	Connects an external monitor or overhead projector.
8	Composite TV connector	Connects a television, VCR, camcorder, or overhead projector.
9	RJ-45 jack (network models only)	Connects the network cable. A network cable is not included with the computer.
10	USB connectors (2)	Connects USB devices.
11	Vent	Allows airflow to cool internal components. ⚠ **CAUTION:** To prevent damage, the computer shuts down if an overheating condition occurs. Do not block the cooling vent. Avoid placing the computer on a blanket, rug, or other flexible surface that may cover the vent area.
12	Hard drive	Supports the removable primary hard drive. Two screws secure the hard drive to the computer.
13	PC Card slots (2)	Support a 32-bit (CardBus) or 16-bit PC Card.
14	PC Card eject buttons	Eject a PC Card from a PC Card slot.

The keyboard components are shown in Figure 1-4 and described in Table 1-4.

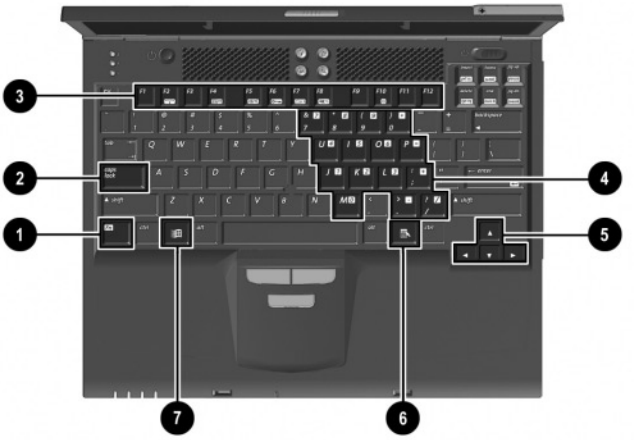


Figure 1-4. Keyboard Components

Table 1-4
Keyboard Components

Item	Component	Function
1	**Fn** key	Used with hotkeys to perform preset hotkey functions.
2	**Caps lock** key	Turns on the caps lock function.
3	**F1** through **F12** function keys	Perform preset functions.
4	Embedded numeric keypad	Converts keys to numeric keypad.
5	Cursor control keys	Move the cursor around the screen.
6	Windows application key	Displays a menu when using a Microsoft application. The menu is the same one that is displayed by pressing the right mouse button.
7	Windows logo key	Displays Windows Start menu.

The components on the top of the computer are shown in Figure 1-5 and described in Table 1-5.

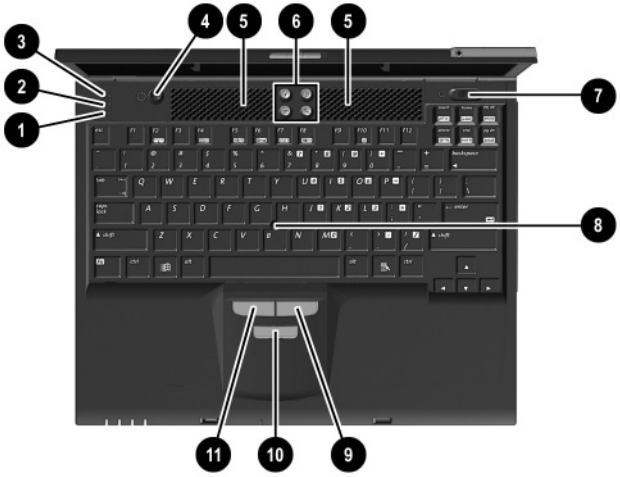


Figure 1-5. Top Components

Table 1-5
Top Components

Item	Component	Function
1	Num lock light	On: Num lock is on and the embedded numeric keypad is enabled.
2	Scroll lock light	On: Scroll is on.

Table 1-5
Top Components *(Continued)*

Item	Component	Function
3	Caps lock light	On: Caps lock is on.
4	**Standby** button	Turns on the computer if it is off. Initiates and exits Standby. When pressed with the **Fn** key, initiates Hibernation.
5	Stereo speakers (2)	Produce stereo sound.
6	Easy Access buttons (4)	Provide quick access to the Internet. Refer to the *Hardware Guide* that ships with the computer for information about these buttons.
7	Power switch	Turns on the computer. To turn off the computer, use the operating system Shut Down command.
8	Pointing stick	Moves the mouse cursor.
9	Right mouse button	Functions like the right mouse button on an external mouse.
10	**Scroll** button	Can be set to scroll, magnify, or function like the third button on an external mouse.
11	Left mouse button	Functions like the left mouse button on an external mouse.

The external components on the bottom of the computer are shown in Figure 1-6 and described in Table 1-6.

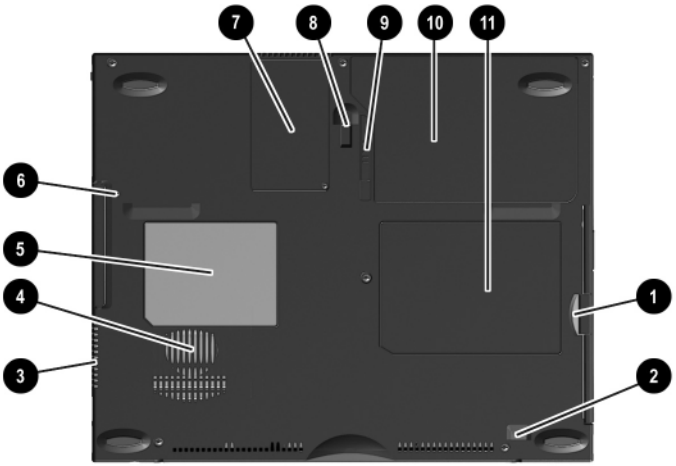


Figure 1-6. Bottom Components

Table 1-6
Bottom Components

Item	Component	Function
1	MultiBay	Accepts a diskette drive, CD- or DVD-ROM drive, or secondary battery pack.
2	MultiBay release latch	Releases the MultiBay device from the connector.
3	Air vent	Allows airflow to cool internal components.
4	Fan	Provides airflow to cool internal components.

Table 1-6
Bottom Components *(Continued)*

Item	Component	Function
5	Certificate of Authenticity label	Contains the Product Key, which may need to be entered before using some Windows operating systems.
6	Hard drive security screw	Secures the hard drive.
7	Memory expansion compartment cover	Covers the memory expansion compartment that contains two memory expansion slots for memory expansion boards.
8	Docking recess latch	Secures the computer to an optional expansion base, convenience base, or port replicator.
9	Battery release latch	Releases the battery pack from the battery compartment.
10	Battery compartment	Holds the battery pack.
11	Serial number	Identifies the computer; needed when you call Compaq customer support.

1.5 Design Overview

This section presents a design overview of key parts and features of the computer. Refer to Chapter 3, “Illustrated Parts Catalog,” to identify replacement parts, and Chapter 5, “Removal and Replacement Procedures,” for disassembly steps. The system board provides the following device connections:

- Memory expansion board
- Hard drive
- Display
- Keyboard/TouchPad or pointing stick
- Audio
- Intel Pentium III processors
- Fan
- PC Card
- Modem or modem/NIC

The computer uses an electrical fan for ventilation. The fan is controlled by a temperature sensor and is designed to turn on automatically when high temperature conditions exist. These conditions are affected by high external temperatures, system power consumption, power management/battery conservation configurations, battery fast charging, and software applications. Exhaust air is displaced through the ventilation grill located on the left side of the computer.



CAUTION: To properly ventilate the computer, allow at least a 3-inch (7.6 cm) clearance on the left and right sides of the computer.

2

Troubleshooting

WARNING: Only authorized technicians trained by Compaq should repair this equipment. All troubleshooting and repair procedures are detailed to allow only subassembly/module level repair. Because of the complexity of the individual boards and subassemblies, no one should attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs can create a safety hazard. Any indication of component replacement or printed wiring board modification may void any warranty or exchange allowances.

2.1 Computer Setup and Diagnostics Utilities

Selecting Computer Setup or Compaq Diagnostics

The computer features two Compaq system management utilities:

- **Computer Setup**—A system information and customization utility that can be used even when your operating system is not working or will not load. This utility includes settings that are not available in Windows.
- **Compaq Diagnostics**—A system information and diagnostic utility that is used within your Windows operating system. Use this utility whenever possible to:
  - Display system information.

- ❏ Test system components.
- ❏ Troubleshoot a device configuration problem in Windows 98, Windows 2000, or Windows Me.



It is not necessary to configure a device that is connected to a USB connector on the computer or to an optional docking base.

Using Computer Setup

Information and settings in Computer Setup are accessed from the File, Security, or Advanced menus:

1. Turn on or restart the computer. Press **F10** while the F10 = ROM Based Setup message is displayed in the lower-left corner of the screen.
   - ❏ To change the language, press **F2.**
   - ❏ To view navigation information, press **F1.**
   - ❏ To return to the Computer Setup menu, press **esc.**
2. Select the File, Security, or Advanced menu.
3. To close Computer Setup and restart the computer:
   - ❏ Select File > Save Changes and Exit and press **enter.**

     or
   - ❏ Select File > Ignore Changes and Exit and press **enter.**
4. When you are prompted to confirm your action, press **F10.**

Selecting from the File Menu

Table 2-1
File Menu

Select	To Do This
System Information	■ View identification information about the computer, a docking base, and any battery packs in the system. ■ View specification information about the processor, memory and cache size, and system ROM.
Save to Floppy	Save system configuration settings to a diskette.
Restore from Floppy	Restore system configuration settings from a diskette.
Restore Defaults	Replace configuration settings in Computer Setup with factory default settings. (Identification information is retained.)
Ignore Changes and Exit	Cancel changes entered during the current session, then exit and restart the computer.
Save Changes and Exit	Save changes entered during the current session, then exit and restart the computer.

Selecting from the Security Menu

Table 2-2
Security Menu

Select	To Do This
Setup Password	Enter, change, or delete a setup password. (The setup password is called an administrator password in Compaq Computer Security, a program accessed from the Windows Control Panel.)
Power-on Password	Enter, change, or delete a power-on password.
DriveLock Passwords	Enable/disable DriveLock; change a DriveLock User or Master password. ✎ Drive Lock Settings are accessible only when you enter Computer Setup by turning on (not restarting) the computer.
Password Options ✎ Password options can be selected only when a power-on password has been set.	Enable/disable: ■ QuickLock ■ QuickLock on Suspend ■ QuickBlank ✎ To enable QuickLock on Suspend or QuickBlank, you must first enable QuickLock.
Device Security	Enable/disable: ■ Ports or diskette drives* ■ Diskette write* ■ CD-ROM or diskette startup ✎ Settings for a DVD-ROM can be entered in the CD-ROM field.
System IDs	Enter identification numbers for the computer, a docking base, and all battery packs in the system.

*Not applicable to SuperDisk LS-120 drives.

Selecting from the Advanced Menu

Table 2-3
Advanced Menu

Select	To Do This
Language (or press **F2**)	Change the Computer Setup language.
Boot Options	Enable/disable: ■ QuickBoot, which starts the computer more quickly by eliminating some startup tests. (If you suspect a memory failure and want to test memory automatically during startup, disable QuickBoot.) ■ MultiBoot, which sets a startup sequence that can include most bootable devices and media in the system.
Device Options	■ Enable/disable the embedded numeric keypad at startup. ■ Enable/disable multiple standard pointing devices at startup. (To set the computer to support only a single, usually nonstandard, pointing device at startup, select Disable.) ■ Enable/disable USB legacy support for a USB keyboard. (When USB legacy support is enabled, the keyboard works even when a Windows operating system is not loaded.) ■ Set an optional external monitor or overhead projector connected to a video card in a docking base as the primary device. (When the computer display is set as secondary, the computer must be shut down before undocking from a docking base.)

Table 2-3
Advanced Menu *(Continued)*

Select	To Do This
Device Options *(continued)*	■ Change the parallel port mode from EPP (Enhanced Parallel Port [default]) to standard, bidirectional, or ECP (Enhanced Capabilities Port). ■ Set video-out mode to NTSC (default), PAL, NTSC-J, or PAL-M.* ■ Enable/disable all settings in the SpeedStep window. (When Disable is selected, the computer runs in Battery Optimized mode.) ■ Specify how the computer recognizes multiple identical docking bases that are identically equipped. (Select Disable to recognize the docking bases as a single docking base; select Enable to recognize the docking bases individually, by serial number.) ■ Enable/disable the reporting of the processor serial number by the processor to the software.
HDD Self Test Options	Run a quick comprehensive self test on hard drives in the system that support the test features.

*Video modes vary even within regions. However, NTSC is common in North America; PAL, in Europe, Africa, and the Middle East; NTSC-J, in Japan; and PAL-M, in Brazil. Other South and Central American regions may use NTSC, PAL, or PAL-M.

2.2 Using Compaq Diagnostics

When you access Compaq Diagnostics, a scan of all system components is displayed on the screen before the Compaq Diagnostics window opens.

You can display more or less information from anywhere within Compaq Diagnostics by selecting Level on the menu bar.

Compaq Diagnostics is designed to test Compaq components. If non-Compaq components are tested, the results may be inconclusive.

Obtaining, Saving, or Printing Configuration Information

1. Access Compaq Diagnostics by selecting Start > Settings > Control Panel > Compaq Diagnostics.
2. Select Categories, then select a category from the drop-down list.
   - ❏ To save the information, select File > Save As.
   - ❏ To print the information, select File > Print.
3. To close Compaq Diagnostics, select File > Exit.

Obtaining, Saving, or Printing Diagnostic Test Information

1. Access Compaq Diagnostics by selecting Start > Settings > Control Panel > Compaq Diagnostics.
2. Select the Test tab.
3. In the scroll box, select the category or device you want to test.
4. Select a test type:
   - ❏ **Quick Test**—Runs a quick, general test on each device in a selected category.
   - ❏ **Complete Test**—Performs maximum testing on each device in a selected category.
   - ❏ **Custom Test**—Performs maximum testing on a selected device.
     - ◆ To run all tests for your selected device, select the Check All button.
     - ◆ To run only the tests you select, select the Uncheck All button, then select the checkbox for each test you want to run.

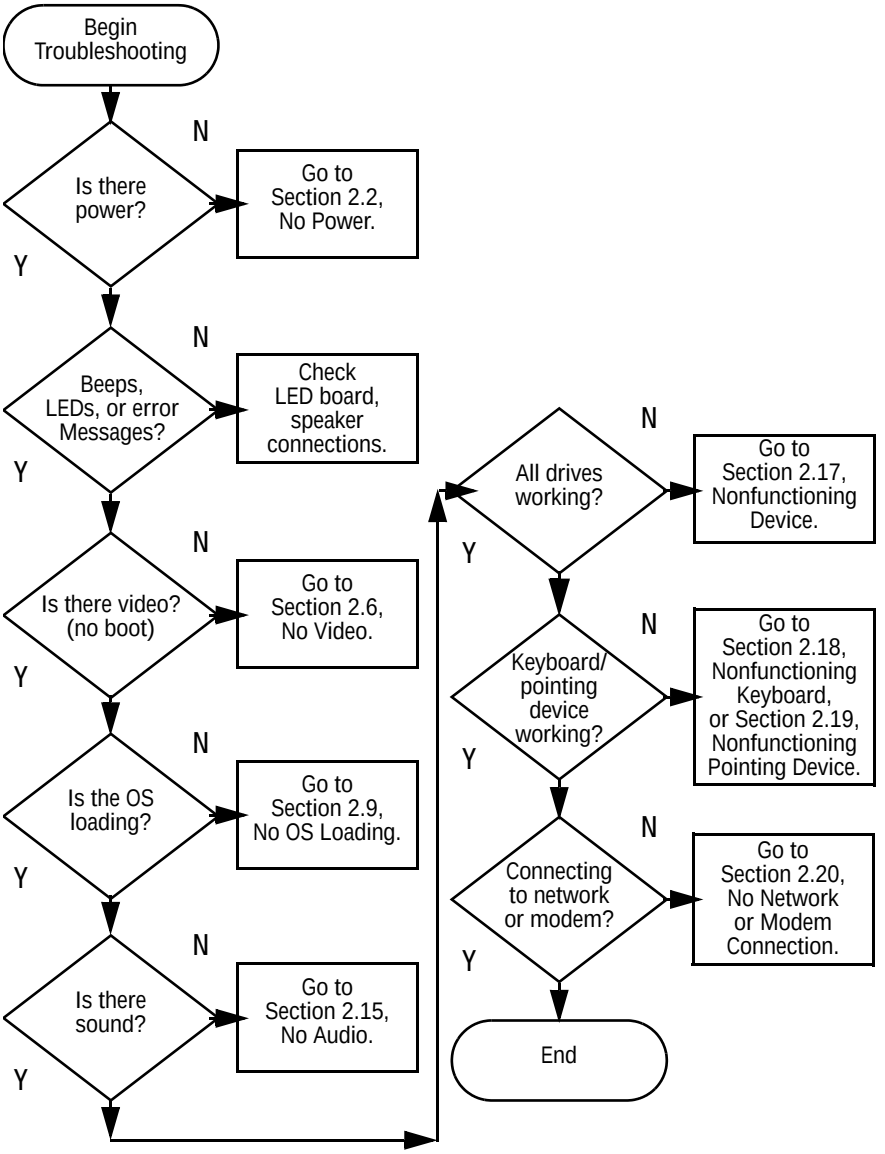
5. Select a test mode:
   - ❏ **Interactive Mode**—Provides maximum control over the testing process. You determine whether the test was passed or failed and may be prompted to insert or remove devices.
   - ❏ **Unattended Mode**—Does not display prompts. If errors are found, they are displayed when testing is complete.
6. Select the Begin Testing button.
7. Select a tab to view a test report:
   - ❏ **Status tab**—Summarizes the tests run, passed, and failed during the current testing session.
   - ❏ **Log tab**—Lists tests run on the system, the number of times each test has run, the number of errors found on each test, and the total run time of each test.
   - ❏ **Error tab**—Lists all errors found in the computer with their error codes.
8. Select a tab to save the report:
   - ❏ **Log tab**—Select the Log tab Save button.
   - ❏ **Error tab**—Select the Error tab Save button.
9. Select the Log tab to print the report.

2.3 Troubleshooting Flowcharts

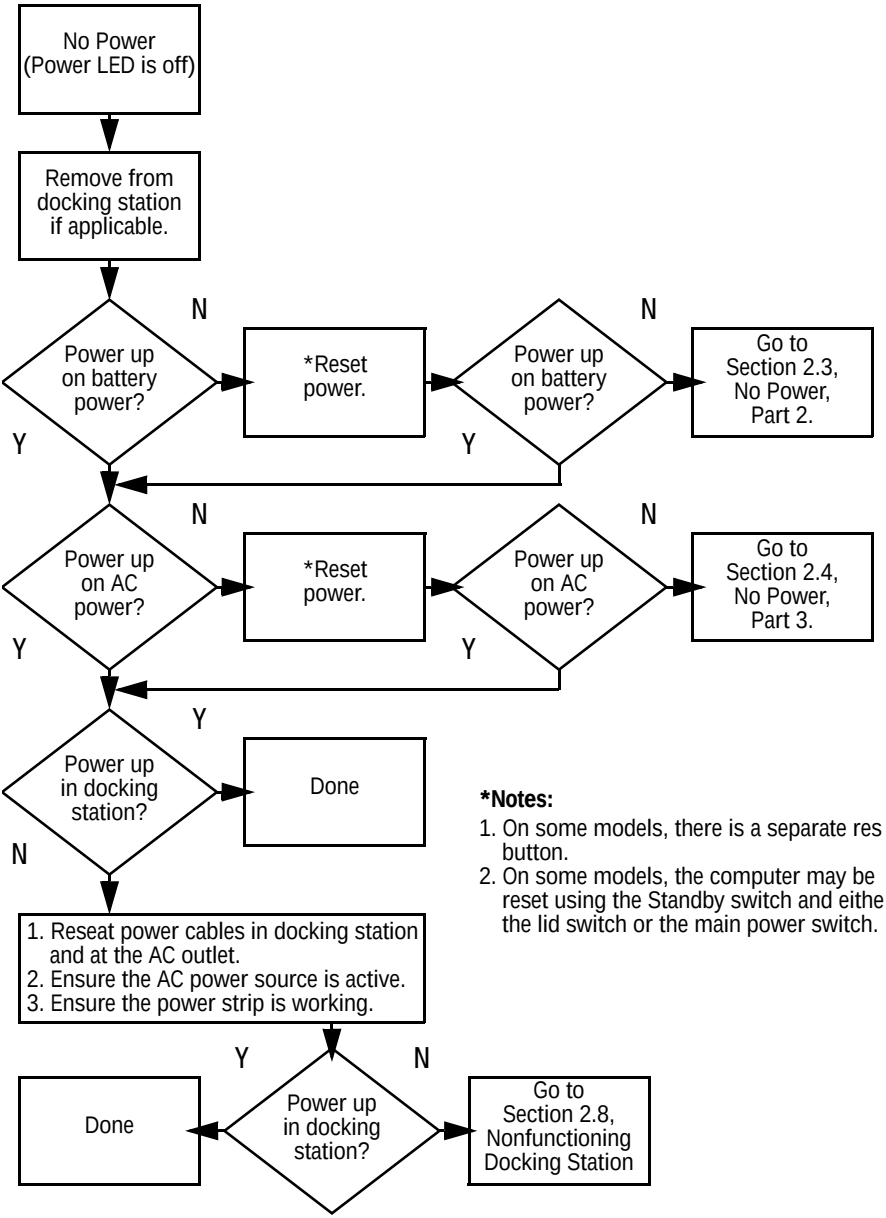
Table 2-4
Troubleshooting Flowcharts Overview

Flowchart	Description
2.1	Initial troubleshooting
2.2	No power, part 1
2.3	No power, part 2
2.4	No power, part 3
2.5	No power, part 4
2.6	No video, part 1
2.7	No video, part 2
2.8	Nonfunctioning docking station
2.9	No operating system (OS) loading
2.10	No OS loading from hard drive, part 1
2.11	No OS loading from hard drive, part 2
2.12	No OS loading from hard drive, part 3
2.13	No OS loading from diskette drive
2.14	No OS loading from CD- or DVD-ROM drive
2.15	No audio, part 1
2.16	No audio, part 2
2.17	Nonfunctioning device
2.18	Nonfunctioning keyboard
2.19	Nonfunctioning pointing device
2.20	No network or modem connection

2.1 Initial Troubleshooting



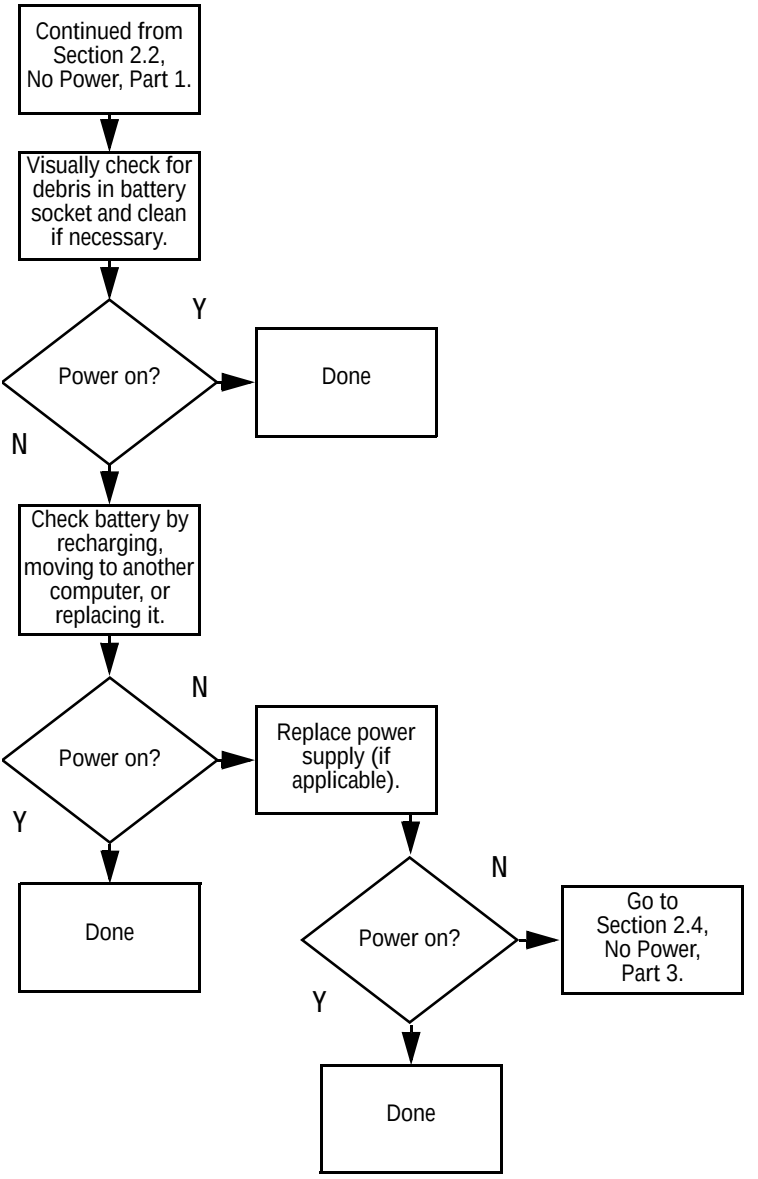
2.2 No Power, Part 1



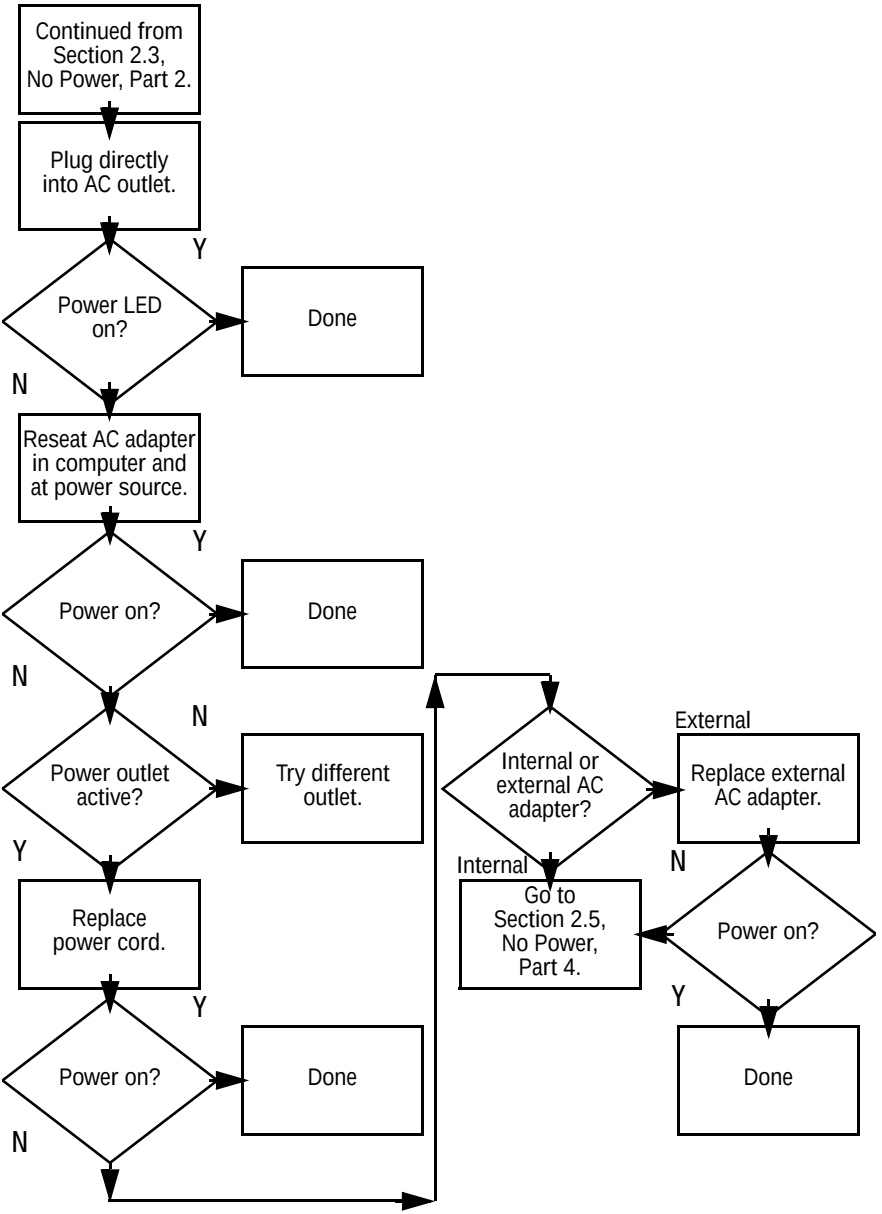
***Notes:**

1. On some models, there is a separate res button.
2. On some models, the computer may be reset using the Standby switch and eithe the lid switch or the main power switch.

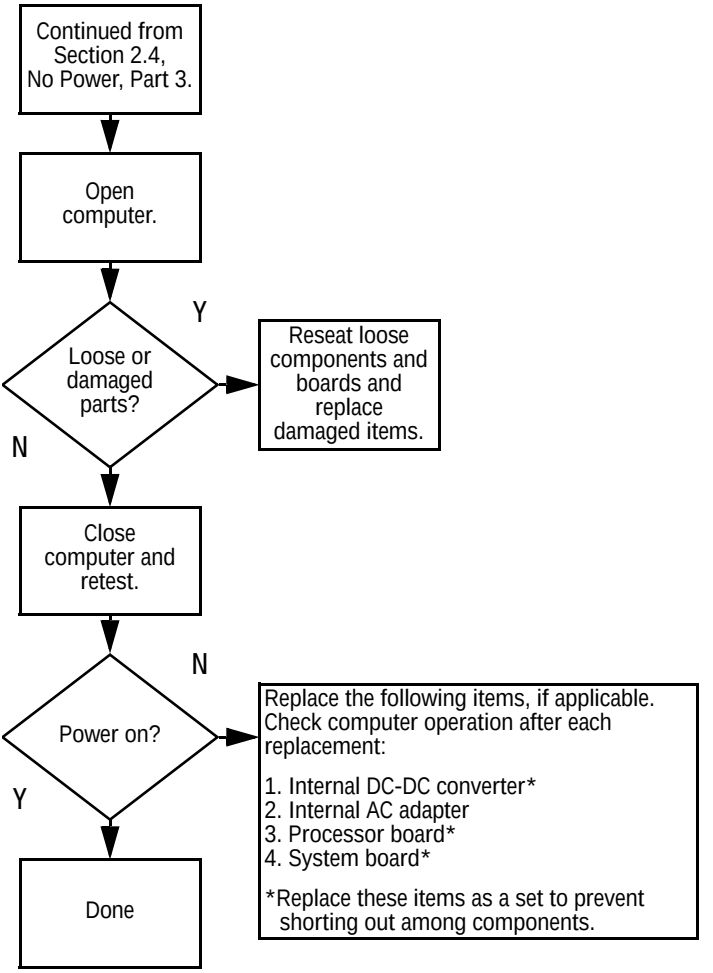
2.3 No Power, Part 2



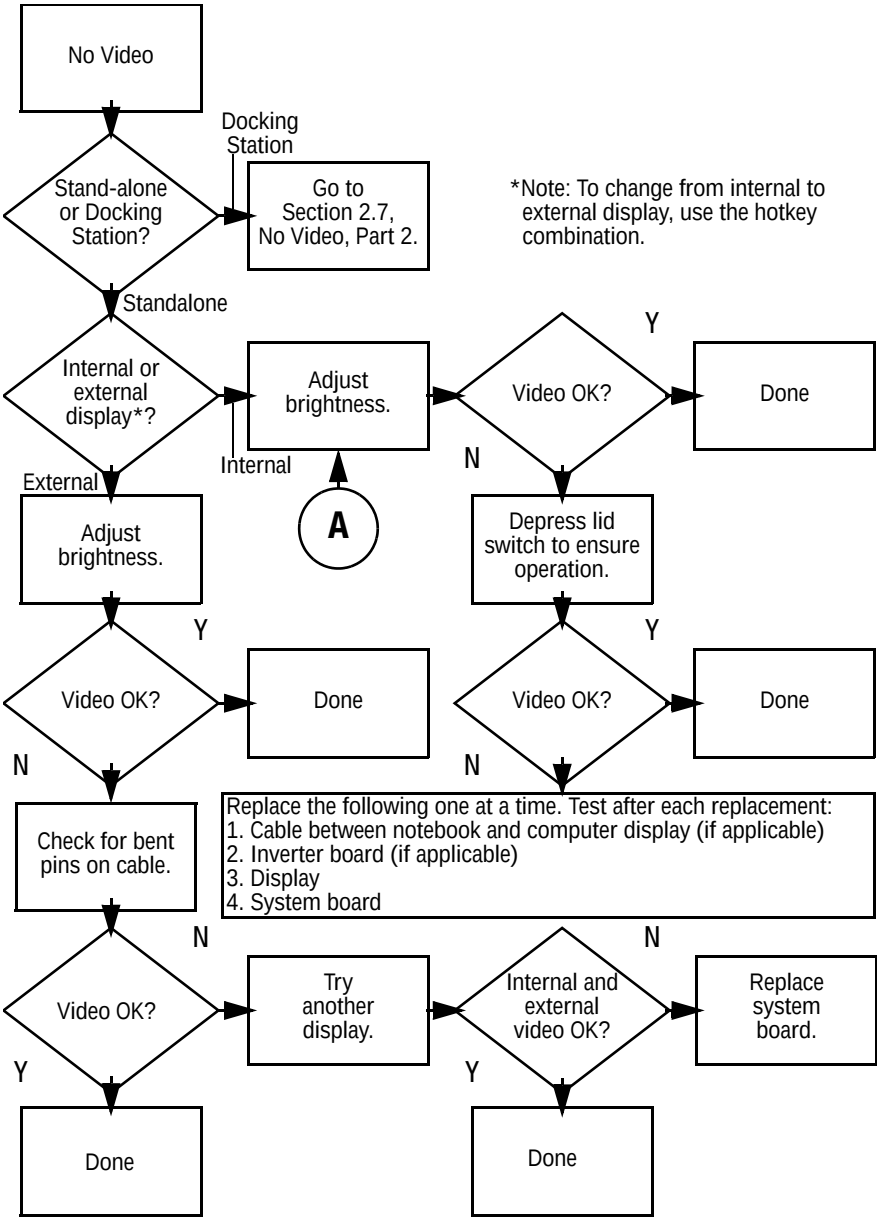
2.4 No Power, Part 3



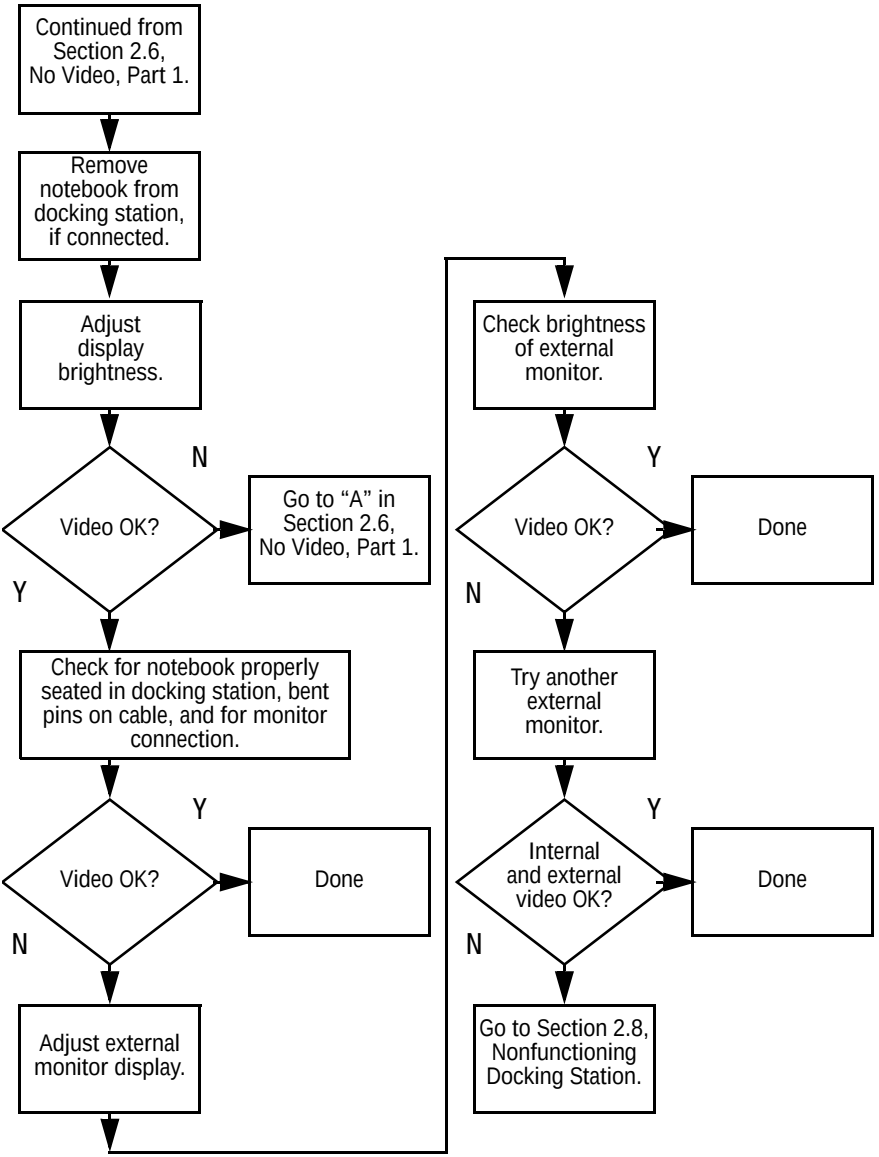
2.5 No Power, Part 4



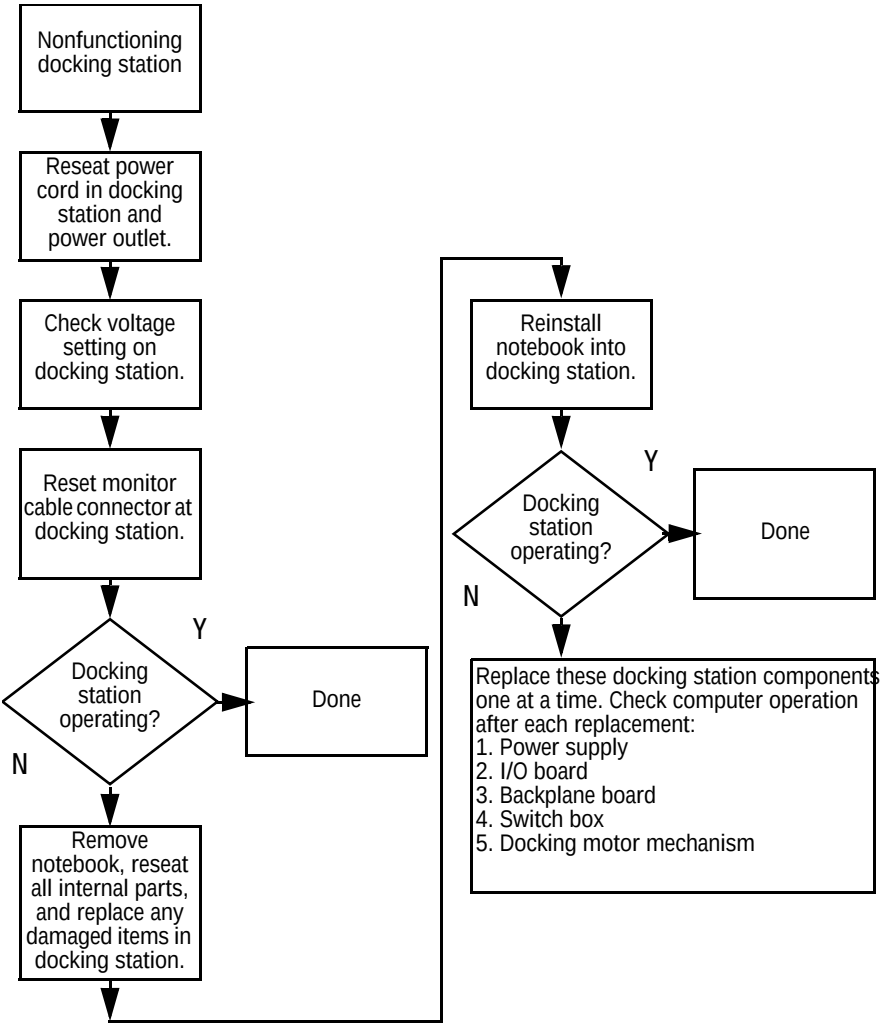
2.6 No Video, Part 1



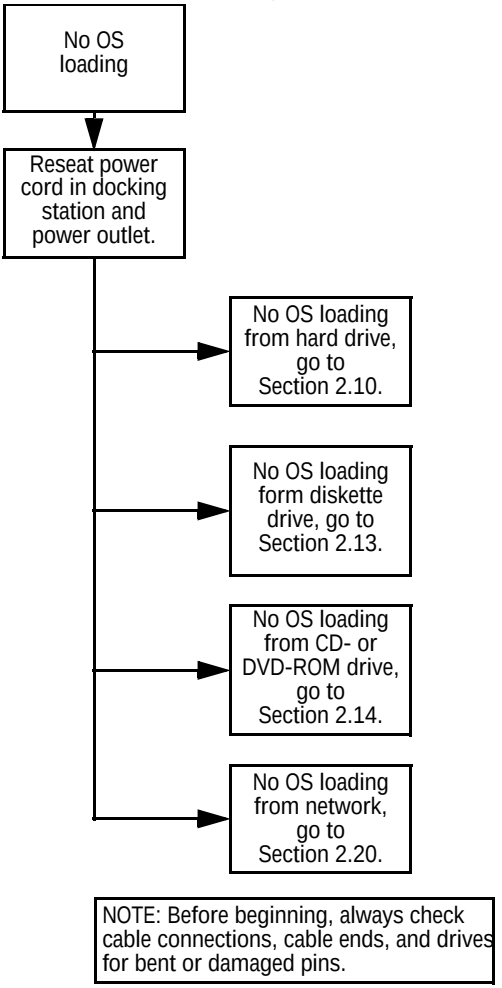
2.7 No Video, Part 2



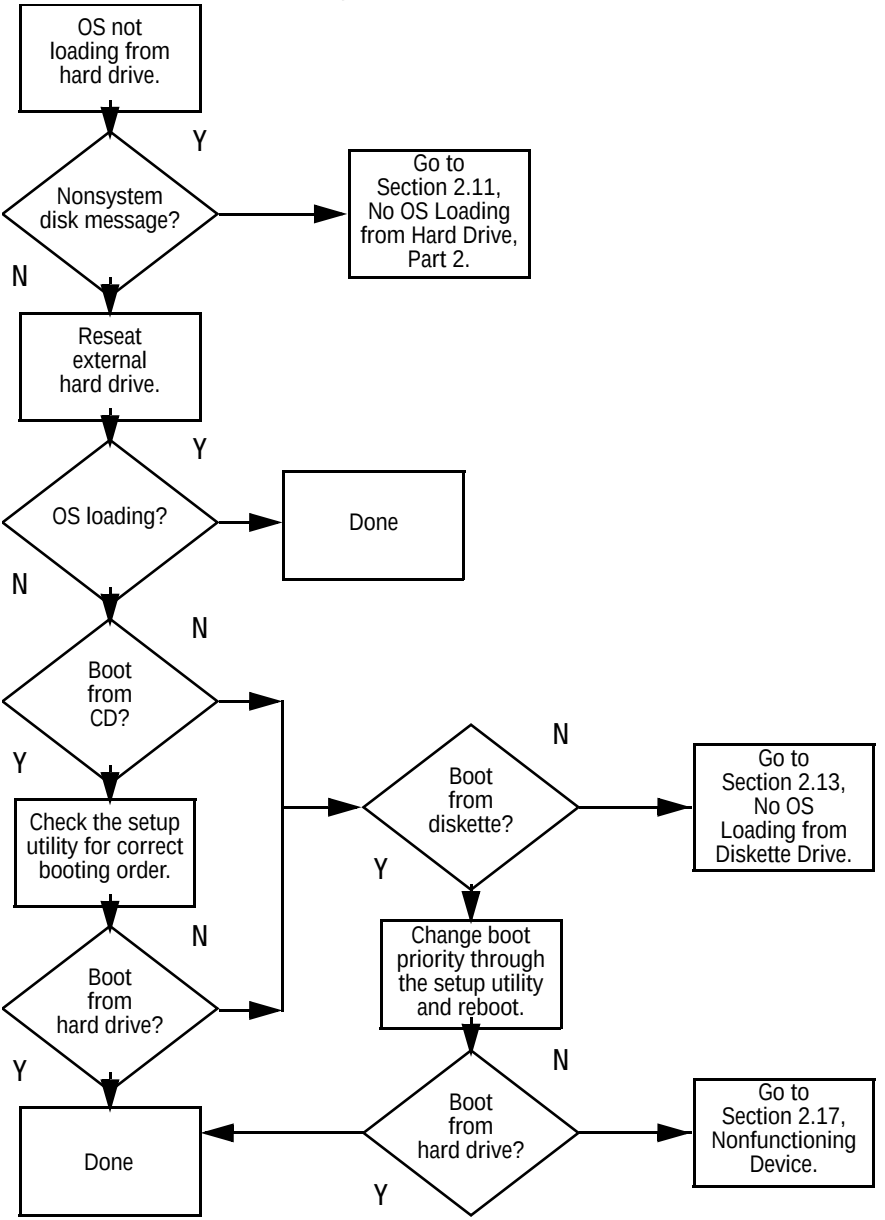
2.8 Nonfunctioning Docking Station (if applicable)



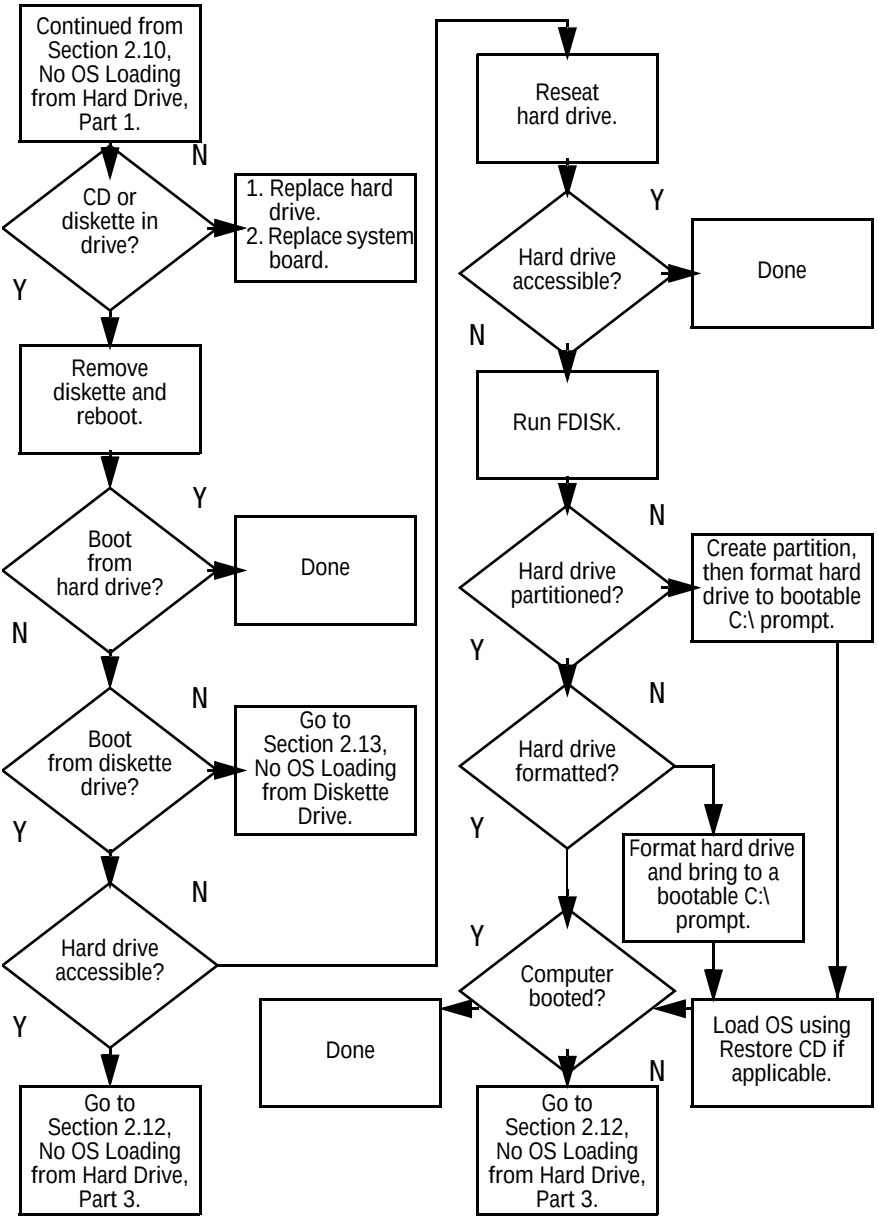
2.9 No Operating System (OS) Loading



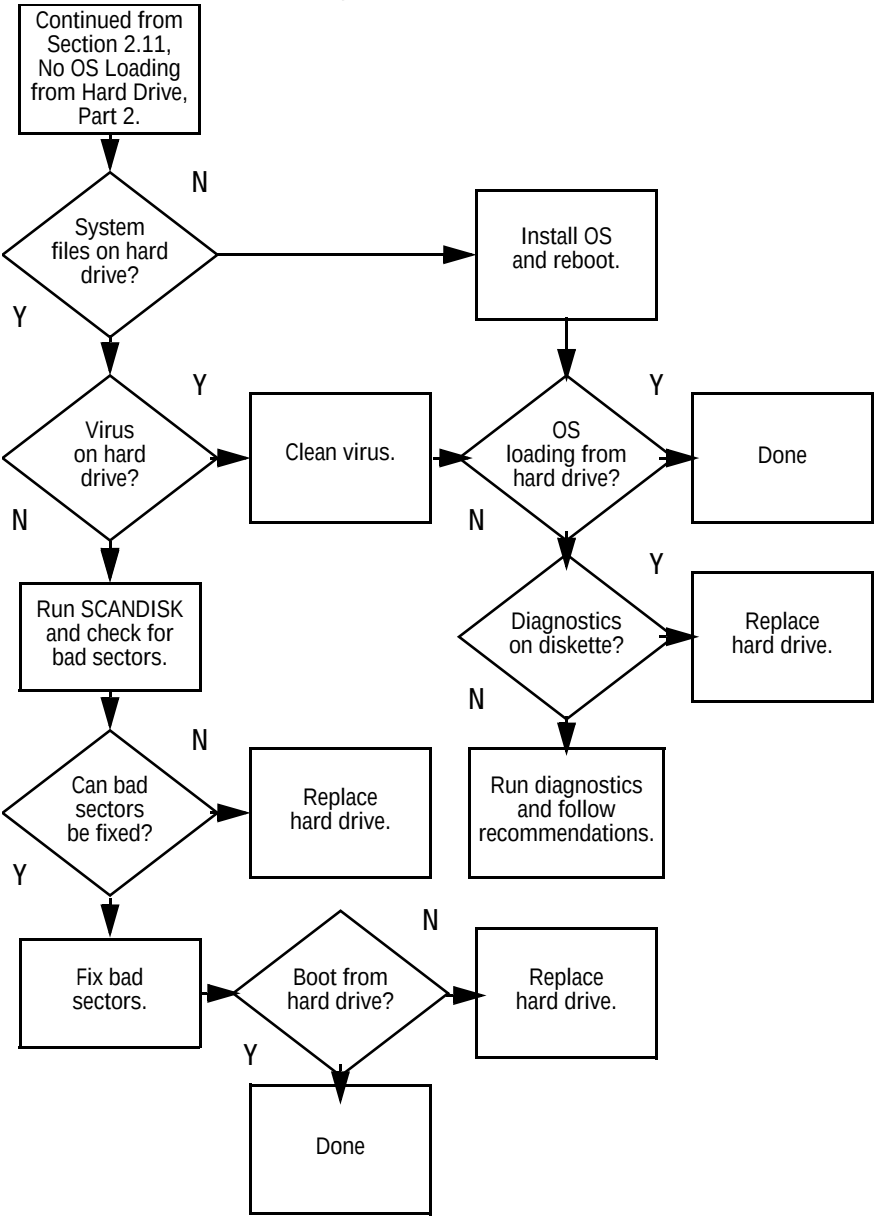
2.10 No OS Loading from Hard Drive, Part 1



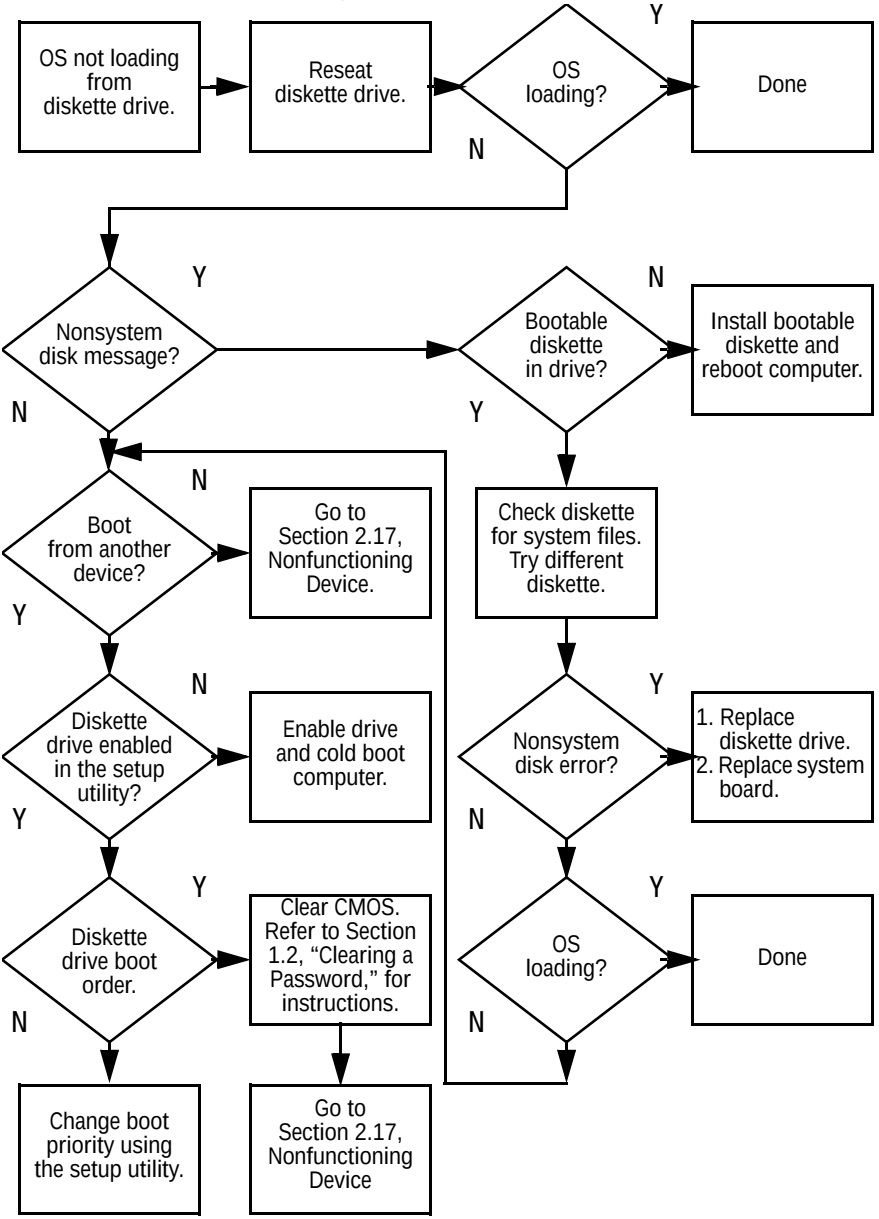
2.11 No OS Loading from Hard Drive, Part 2



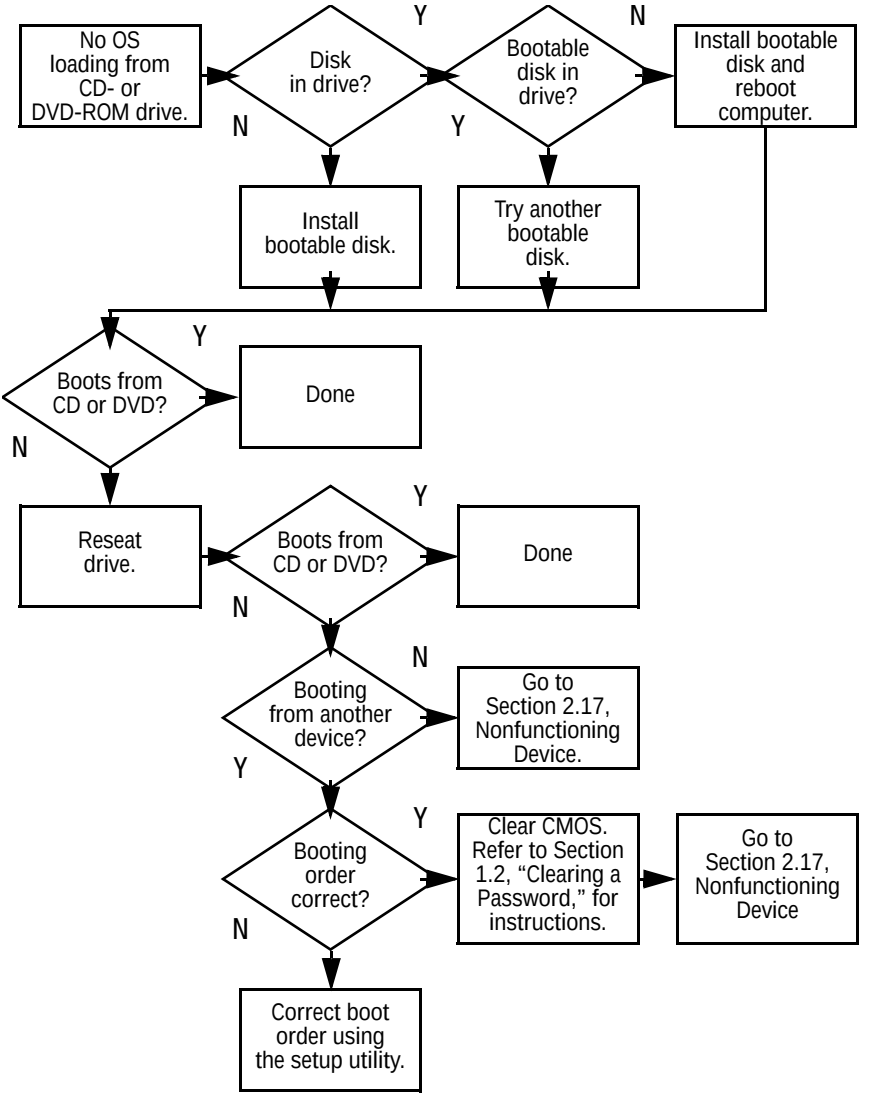
2.12 No OS Loading from Hard Drive, Part 3



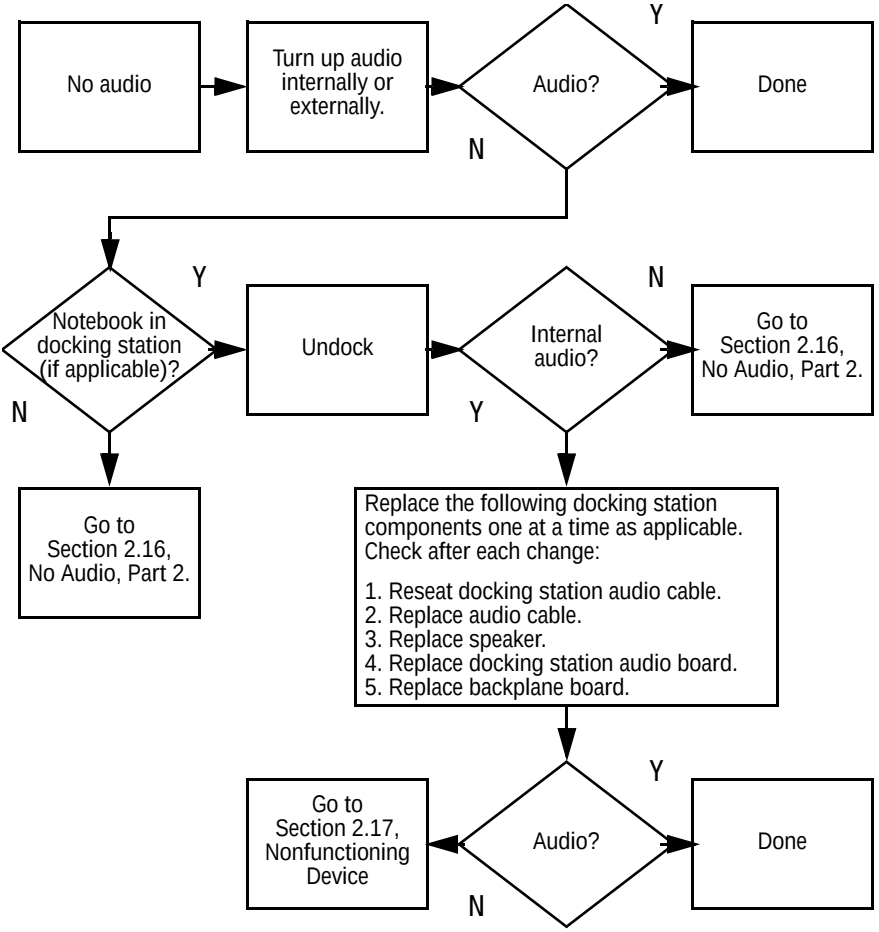
2.13 No OS Loading from Diskette Drive



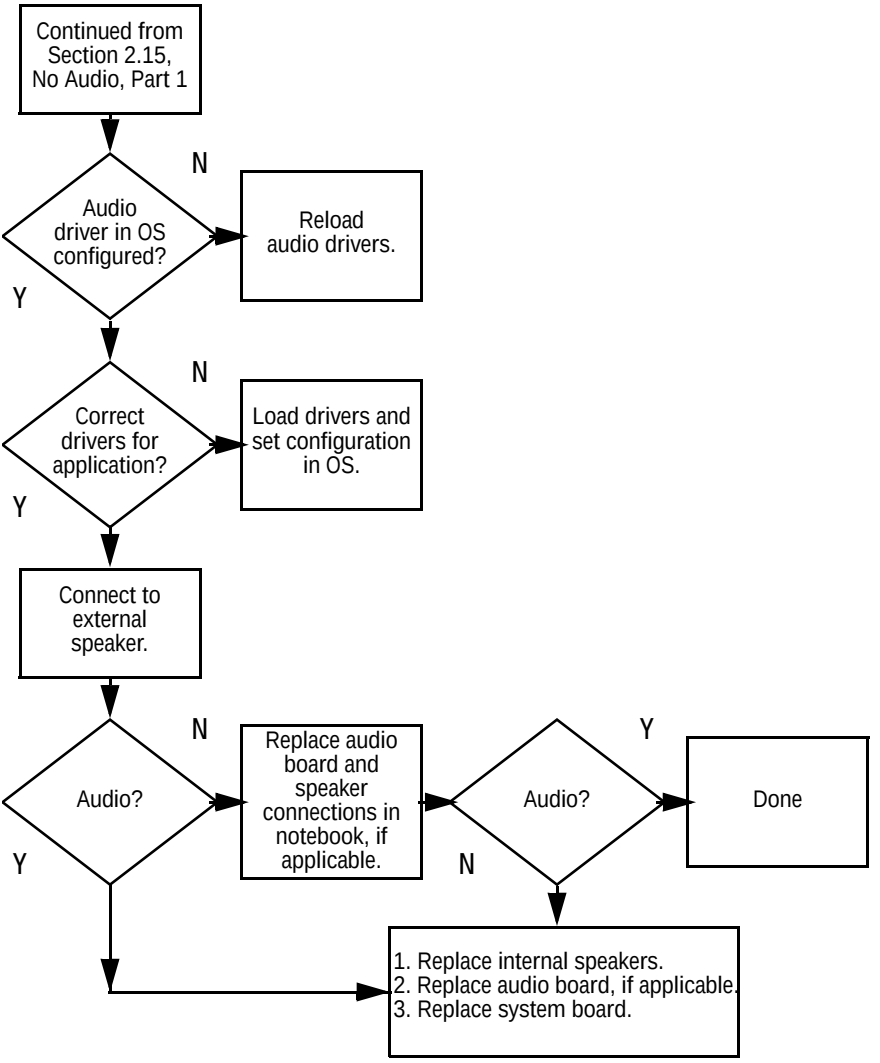
2.14 No OS Loading from CD- or DVD-ROM Drive



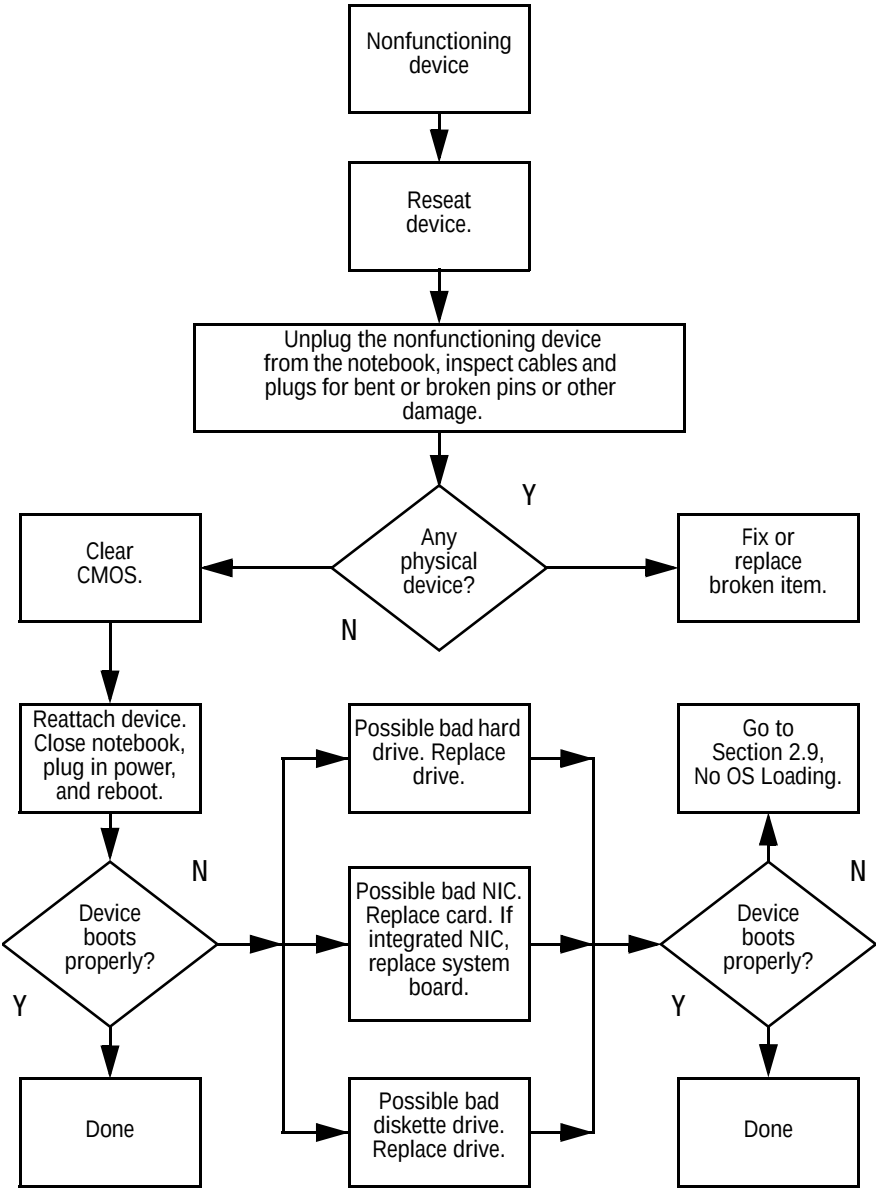
2.15 No Audio, Part 1



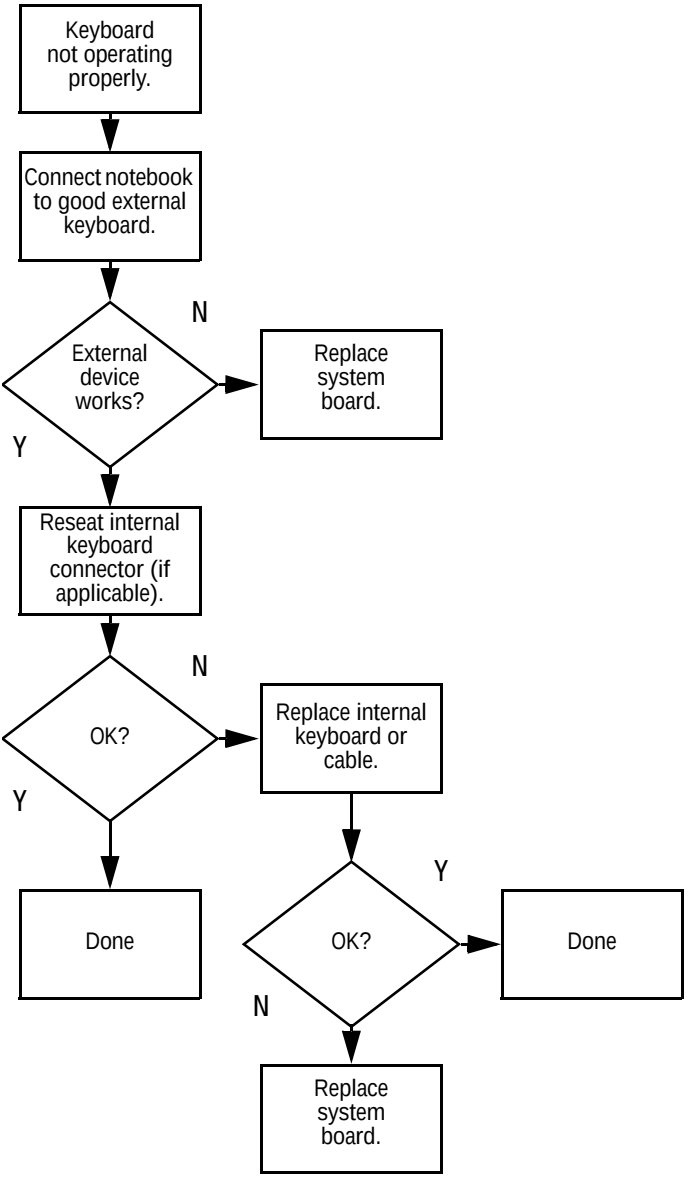
2.16 No Audio, Part 2



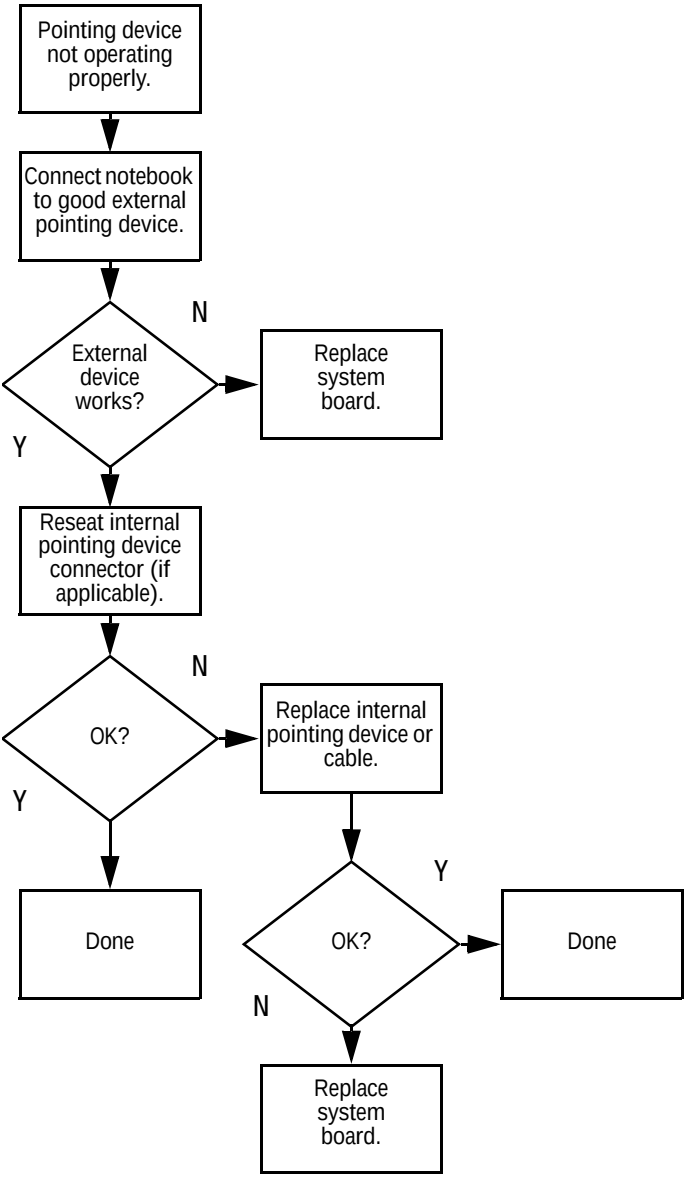
2.17 Nonfunctioning Device



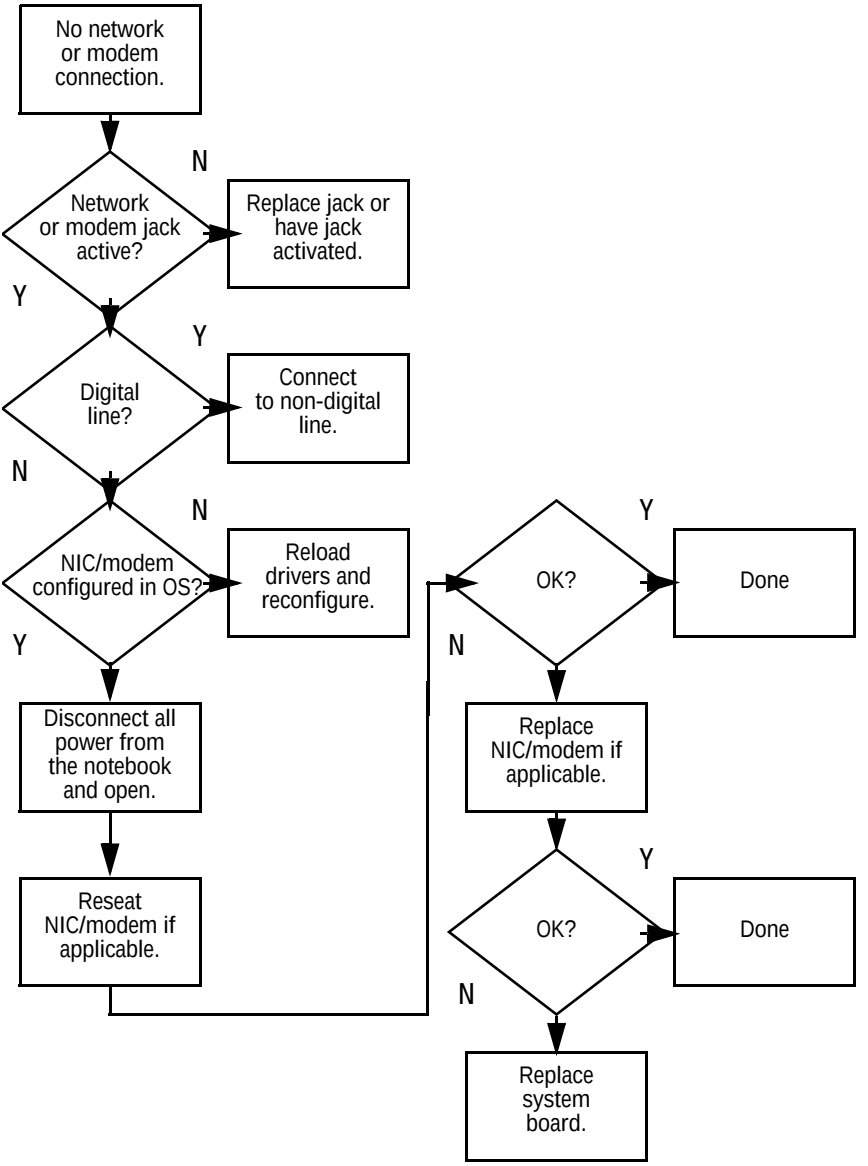
2.18 Nonfunctioning Keyboard



2.19 Nonfunctioning Pointing Device



2.20 Network or Modem Connection Problems



3

Illustrated Parts Catalog

This chapter provides an illustrated parts breakdown and a reference for spare part numbers and option part numbers.

3.1 Serial Number Location

When ordering parts or requesting information, provide the computer serial number and model number located on the bottom of the computer (Figure 3-1).



Figure 3-1. Serial Number Location

3.2 Computer System Major Components

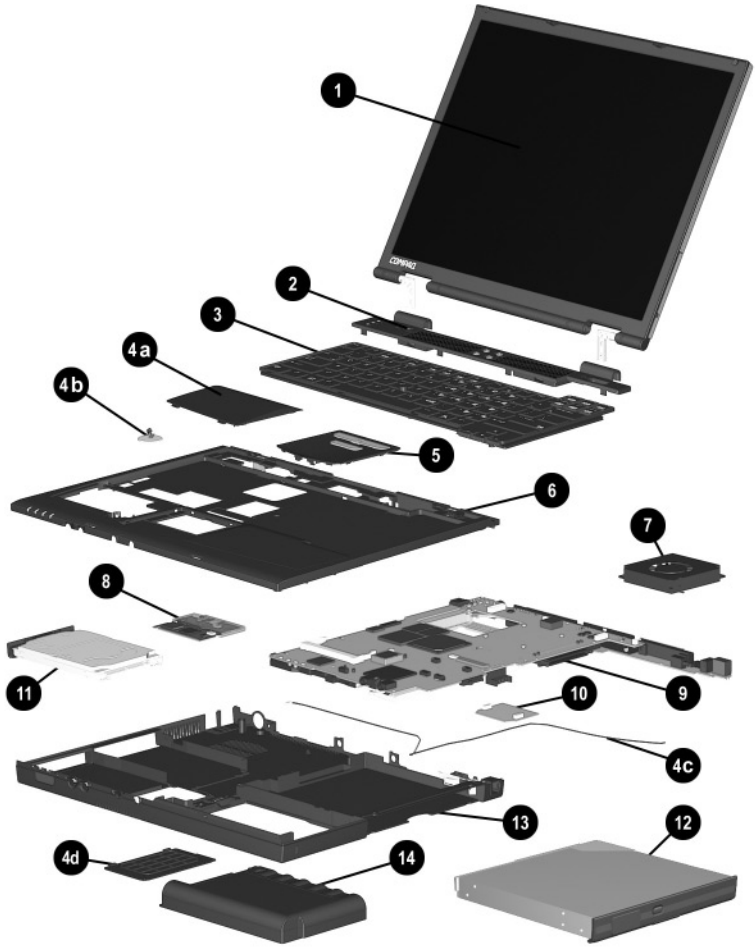
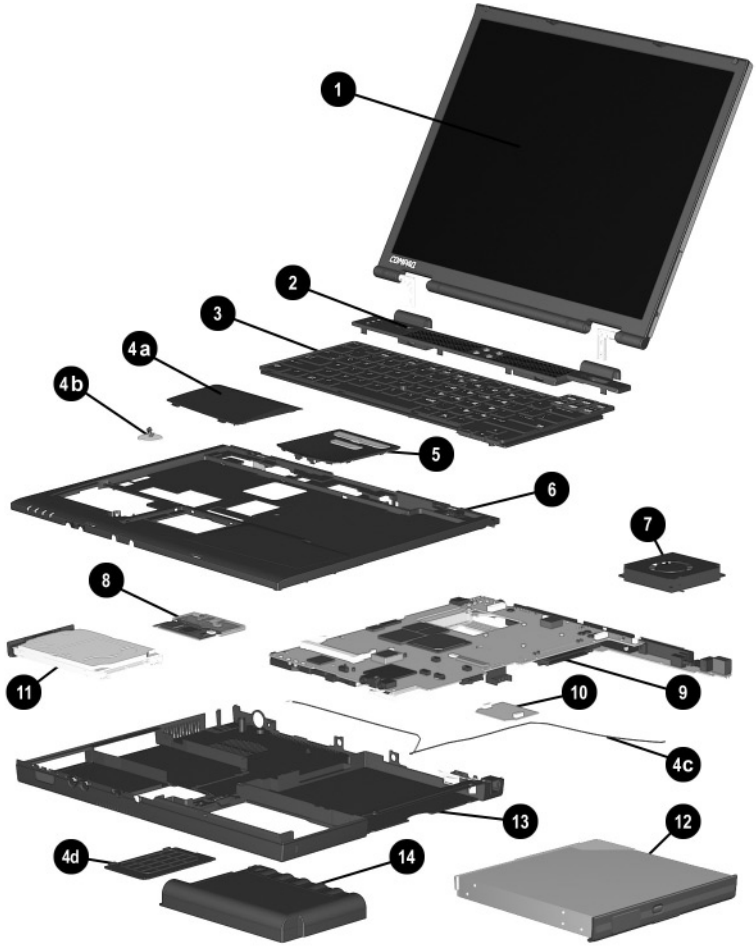


Figure 3-2. Computer System Major Components

Table 3-1
Spare Parts: Computer System Major Components

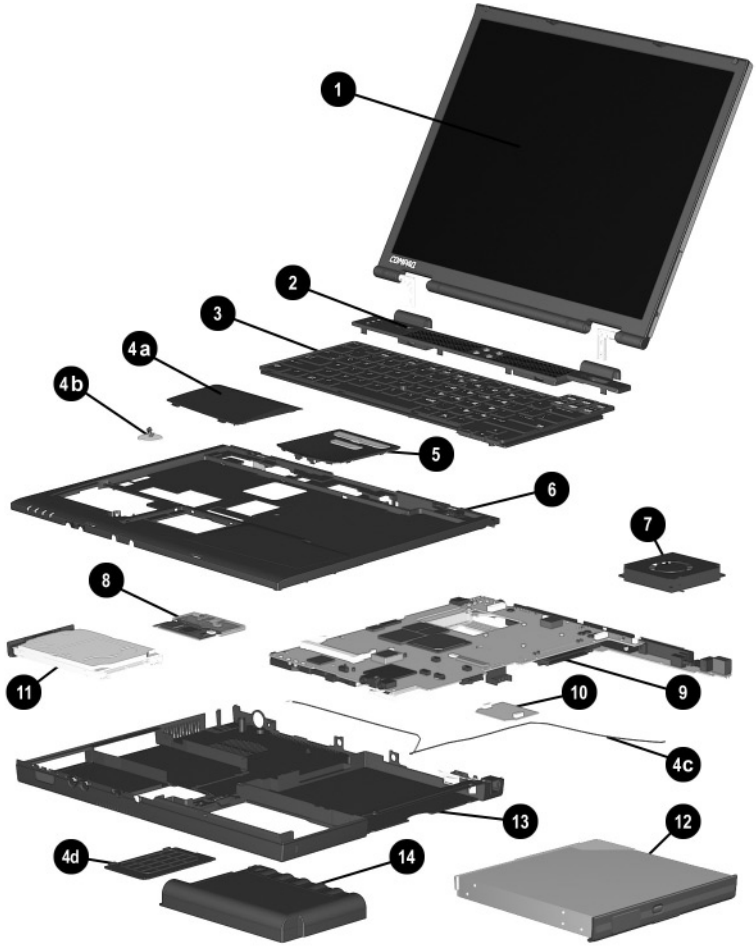
Item	Description	Spare Part Number
1	**Displays**	
	14.1-inch, SXGA+, CTFT	241433-001
	14.1-inch, XGA, CTFT	241434-001
2	**Switch cover**	241438-001
3	**Keyboard** (for use with TouchPad models)	
	Arabic 241427-171	Korean 241427-AD1
	Brazilian 241427-201	Latin American Spanish 241427-161
	Belgian 241427-181	Norwegian 241427-091
	Czech 241427-221	Portuguese 241427-131
	Danish 241427-081	Russian 241427-251
	French 241427-051	Slovenian/ Slovakian 241427-B41
	French Canadian 241427-121	Slovenian 241427-231
	German 241427-041	Spanish 241427-071
	Greek 241427-151	Swedish/Finnish 241427-101
	Hebrew 241427-BB1	Swiss 241427-111
	Hungarian 241427-211	Taiwanese 241427-AB1
	International 241427-002	Turkish 241427-141
	Italian 241427-061	U.K. English 241427-031
	Japanese 241427-291	U.S. English 241427-001



Computer System Major Components (continued)

Table 3-1
Spare Parts: Computer System Major Components *(Continued)*

Item	Description			Spare Part Number
3	**Keyboard** (for use with pointing stick models)			
	Arabic	241428-171	Korean	241428-AD1
	Brazilian	241428-201	Latin American Spanish	241428-161
	Belgian	241428-181	Norwegian	241428-091
	Czech	241428-221	Portuguese	241428-131
	Danish	241428-081	Russian	241428-251
	French	241428-051	Slovenian/ Slovakian	241428-B41
	French Canadian	241428-121	Slovenian	241428-231
	German	241428-041	Spanish	241428-071
	Greek	241428-151	Swedish/Finnish	241428-101
	Hebrew	241428-BB1	Swiss	241428-111
	Hungarian	241428-211	Taiwanese	241428-AB1
	International	241428-002	Turkish	241428-141
	Italian	241428-061	U.K. English	241428-031
	Japanese	241428-291	U.S. English	241428-001
	Miscellaneous Plastics Kit			241439-001
4a	Modem/NIC cover		not illustrated:	
4b	Real time clock (RTC) battery		MultiPort Module cover	
4c	Modem cable		Computer feet	
4d	Memory expansion compartment cover		PC Card slot space savers	
5	**TouchPad** (for use with TouchPad models)			135227-001
	Touch Button (for use with pointing stick models)			159530-001
6	**Top cover**			241436-001
7	**Fan**			255528-001



Computer System Major Components (continued)

Table 3-1
Spare Parts: Computer System Major Components *(Continued)*

Item	Description	Spare Part Number
8	**Mini PCI communications boards**	
	Type III mini PCI combination 56-Kbps modem/NIC board	230338-001
	Type III mini PCI combination 56-Kbps/NIC/3DES board	230339-001
	Type III mini PCI 56-Kbps modem board	230337-001
9	**System boards**	
	Mobile Intel Pentium III processor 1.066 GHz-M	241430-001
	Mobile Intel Pentium III processor 866 MHz-M	241432-001
10	**DC-DC converter board**	241435-001
11	**Hard drives**	
	30 GB	217096-001
	20 GB	235421-001
	15 GB	241429-001
	10 GB	217094-001
12	**MultiBay devices**	
	Diskette drive	135233-001
	24X Max CD-ROM drive	315082-001
	8X Max DVD-ROM drive	173949-001
	4X Max DVD-ROM drive	102266-001
	SuperDisk LS120 drive	218682-001
	IOmega 250-MB ZIP drive	218683-001
	6-cell battery pack	387937-B25
13	**Base enclosure** (includes modem cable)	241437-001
14	**Battery pack** (8-cell, Lithium ion)	232633-001

3.3 Miscellaneous Plastics Kit Components

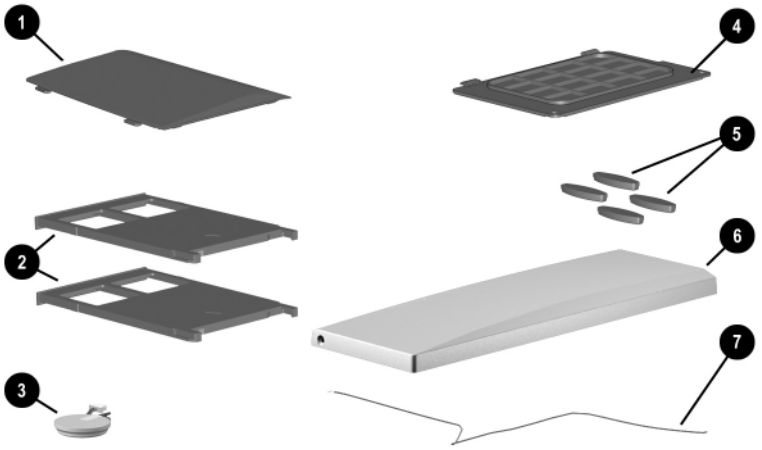


Figure 3-3 Miscellaneous Plastics Kit Components

Table 3-2
Miscellaneous Plastics Kit Components
Spare Part Number 241439-001

Item	Description
1	Modem/NIC cover
2	PC Card slot space savers
3	RTC battery
4	Memory expansion compartment cover
5	Computer feet
6	MultiPort Module cover
7	Modem cable

3.4 Mass Storage Devices

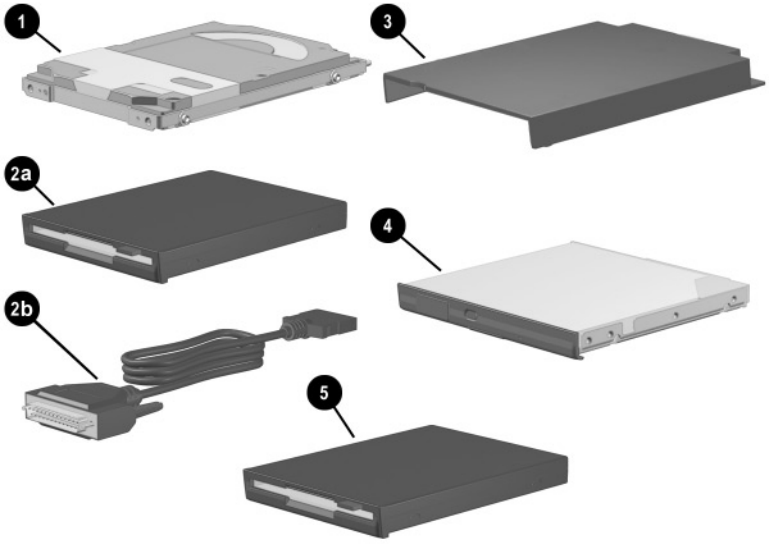
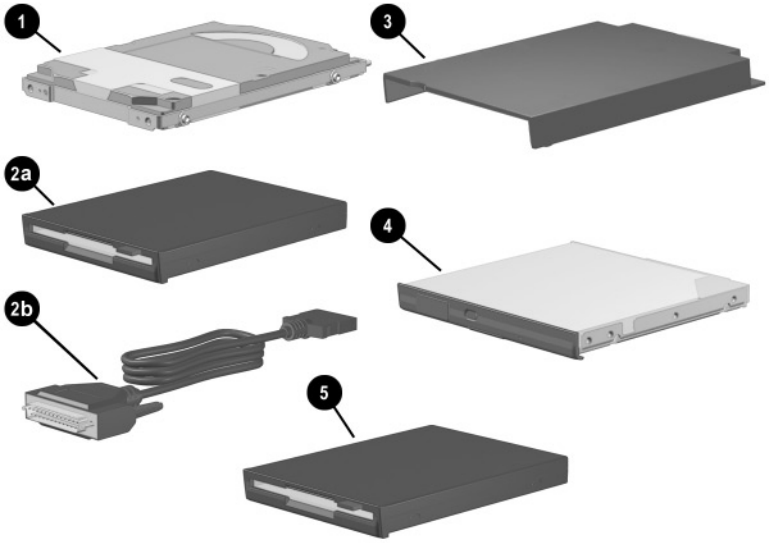


Figure 3-4. Mass Storage Devices

Table 3-3
Mass Storage Devices

Item	Description	Spare Part Number	Option Part Number
1	**Hard drives**		
	30 GB	217096-001	
	20 GB	235421-001	
	15 GB	241429-001	
	10 GB	217094-001	
2a	**Diskette drive**	135233-001	226935-B25
2b	**External diskette drive cable**	135232-001	
3	**External MultiBay cradle**	218685-001	



Mass Storage Devices (continued)

Table 3-3
Miscellaneous Plastic Kit Components (Continued)

Item	Description	Spare Part Number	Option Part Number
4	**Optical drives**		
	24X Max CD-ROM drive	315082-001	298452-B25
	8X Max DVD-ROM drive	173949-001	138320-B25
	4X Max DVD-ROM drive	102266-001	
	CD-RW drive		136186-B25
5	**SuperDisk LS120 drive**	**218682-001**	

Table 3-3
Miscellaneous Plastic Kit Components (Continued)

Item	Description	Spare Part Number	Option Part Number
	IOmega 250-MB ZIP drive (not illustrated)	218683-001	217837-B25
	MultiBay hard drives (not illustrated)		
	30 GB		212791-B25
	20 GB		212790-B25
	10 GB		212789-B25
	1-GB Microdrive (PC Card device, not illustrated)	218684-001	217390-B25

3.5 Miscellaneous

Table 3-4
Spare Parts: Miscellaneous (not illustrated)

Description			Spare Part Number
Modems			
Type III mini PCI combination 56-Kbps modem/NIC board			230338-001
Type III mini PCI combination 56-Kbps/NIC/3DES board			230339-001
Type III mini PCI 56-Kbps modem board			230337-001
Modem adapters			
Czech	234963-221	Norwegian	234963-091
German	236432-041	Swiss	198294-111
Hungarian	234963-211		
Modem cable			234962-001
Modem cable adapters			
Australian	304398-011		
Belgian	304398-181		
French	304398-051		

Table 3-4
Spare Parts: Miscellaneous (not illustrated) *(Continued)*

Description			Spare Part Number
RJ-11 P55 adapters			
Danish	316904-081	Italian	316904-061
Finnish	316904-351	Swedish	316904-101
RJ-11 PTT adapter (used in the United Kingdom)			158593-031
RJ-45 network cable			239049-001
Logo kit			239053-001
Screw kit (includes the following screws and bushing guides; refer to Appendix C, "Screw Listing," for more information on screw specifications and usage) ■ Torx T8 M2 × 7 ■ Torx T8 M2 × 5 ■ 7.0-mm bushing guide ■ Phillips M1 × 6 ■ Phillips M2 × 6.5			241440-001
AC adaptors			
65-Watt AC adapter power supply			239704-001
50-Watt AC adapter power supply			120765-001

Table 3-4
Spare Parts: Miscellaneous (not illustrated) *(Continued)*

Description			Spare Part Number
Power cord, black, 6 feet			
Australian	246959-011	Korean	246959-AD1
Danish	246959-081	Swiss	246959-AG1
European/Middle Eastern/African	246959-021	Taiwanese	234961-AA1
Italian	213352-001	U.K. English	246959-031
Japanese	197233-001	U.S. English	246959-001
Memory expansion boards			
512 MB		238830-B25	
256 MB		197898-B25	167136-001
128 MB		197987-B25	135244-001
64 MB		197896-B25	135243-001
Common power solutions			
6-cell MultiBay battery pack		387937-B25	
External battery charger		135555-XXX	
Auto power adapter/charger		401043-B25	
Aircraft power adapter		386405-B21	

4

Removal and Replacement Preliminaries

This chapter provides essential information for proper and safe removal and replacement service.

4.1 Tools Required

You will need the following tools to complete the removal and replacement procedures:

- Magnetic screwdriver
- Phillips P0 screwdriver
- 7.0-mm socket
- Tool kit (includes connector removal tool, loopback plugs, and case utility tool)

4.2 Service Considerations

The following sections include some of the considerations that you should keep in mind during disassembly and assembly procedures.



As you remove each subassembly from the computer, place the subassembly (and all accompanying screws) away from the work area to prevent damage.

Plastic Parts

Using excessive force during disassembly and reassembly can damage plastic parts. Use care when handling the plastic parts. Apply pressure only at the points designated in the maintenance instructions.

Cables and Connectors

Cables must be handled with extreme care to avoid damage. Apply only the tension required to unseat or seat the cables during removal and insertion. Handle cables by the connector whenever possible. In all cases, avoid bending, twisting, or tearing cables. Ensure that cables are routed in such a way that they cannot be caught or snagged by parts being removed or replaced. Handle flex cables with extreme care; these cables tear easily.



CAUTION: When servicing the computer, ensure that cables are placed in their proper locations during the reassembly process. Improper cable placement can damage the computer.

4.3 Preventing Damage to Removable Drives

Removable drives are fragile components that must be handled with care. To prevent damage to the computer, damage to a removable drive, or loss of information, observe the following precautions:

- Before removing or inserting a hard drive, shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, then shut it down.
- Before removing a diskette drive or optical drive, ensure that a diskette or disc is not in the drive. Ensure that the optical drive tray is closed.
- Before handling a drive, ensure that you are discharged of static electricity. While handling a drive, avoid touching the connector.
- Handle drives on surfaces that have at least one inch of shock-proof foam.
- Avoid dropping drives from any height onto any surface.
- After removing a hard drive, CD-ROM drive, or a diskette drive, place it into a static-proof bag.
- Avoid exposing a hard drive to products that have magnetic fields, such as monitors or speakers.
- Avoid exposing a drive to temperature extremes or to liquids.
- If a drive must be mailed, place the drive into a bubble pack mailer or other suitable form of protective packaging and label the package “Fragile: Handle With Care.”

4.4 Preventing Electrostatic Damage

Many electronic components are sensitive to electrostatic discharge (ESD). Circuitry design and structure determine the degree of sensitivity. Networks built into many integrated circuits provide some protection, but in many cases the discharge contains enough power to alter device parameters or melt silicon junctions.

A sudden discharge of static electricity from a finger or other conductor can destroy static-sensitive devices or microcircuitry. Often the spark is neither felt nor heard, but damage occurs. An electronic device exposed to electrostatic discharge may not be affected at all and can work perfectly throughout a normal cycle. The device may function normally for awhile, then degrade in the internal layers, reducing its life expectancy.

4.5 Packaging and Transporting Precautions

Use the following grounding precautions when packaging and transporting equipment:

- To avoid hand contact, transport products in static-safe containers, such as tubes, bags, or boxes.
- Protect all electrostatic-sensitive parts and assemblies with conductive or approved containers or packaging.
- Keep electrostatic-sensitive parts in their containers until the parts arrive at static-free workstations.
- Place items on a grounded surface before removing items from their containers.
- Always be properly grounded when touching a sensitive component or assembly.

- Place reusable electrostatic-sensitive parts from assemblies in protective packaging or nonconductive foam.
- Use transporters and conveyers made of antistatic belts and roller bushings. Ensure that mechanized equipment used for moving materials is wired to ground and that proper materials were selected to avoid static charging. When grounding is not possible, use an ionizer to dissipate electric charges.

4.6 Workstation Precautions

Use the following grounding precautions at workstations:

- Cover the workstation with approved static-dissipative material (refer to Table 4-2).
- Use a wrist strap connected to a properly grounded work surface and use properly grounded tools and equipment.
- Use conductive field service tools, such as cutters, screwdrivers, and vacuums.
- When using fixtures that must directly contact dissipative surfaces, only use fixtures made of static-safe materials.
- Keep the work area free of nonconductive materials, such as ordinary plastic assembly aids and Styrofoam.
- Handle electrostatic-sensitive components, parts, and assemblies by the case or PCM laminate. Handle these items only at static-free workstations.
- Avoid contact with pins, leads, or circuitry.
- Turn off power and input signals before inserting or removing connectors or test equipment.

4.7 Grounding Equipment and Methods

Grounding equipment must include either a wrist strap or a foot strap at a grounded workstation.

- When seated, wear a wrist strap connected to a grounded system. Wrist straps are flexible straps with a minimum of one megaohm ±10% of resistance in the ground cords. To provide proper ground, wear a strap snugly against the skin at all times. On grounded mats with banana-plug connectors, connect a wrist strap with alligator clips.
- When standing, use foot straps and a grounded floor mat. Foot straps (heel, toe, or boot straps) can be used at standing workstations and are compatible with most types of shoes or boots. On conductive floors or dissipative floor mats, use foot straps on both feet with a minimum of one megaohm of resistance between the operator and ground. To be effective, the conductive strips must be worn in contact with the skin.

Other grounding equipment recommended for use in preventing electrostatic damage includes:

- Antistatic tape
- Antistatic smocks, aprons, and sleeve protectors
- Conductive bins and other assembly or soldering aids
- Nonconductive foam
- Conductive tabletop workstations with ground cords of one-megohm resistance
- Static-dissipative table or floor mats with hard tie to ground
- Field service kits
- Static awareness labels
- Material-handling packages

- Nonconductive plastic bags, tubes, or boxes
- Metal tote boxes
- Electrostatic voltage levels and protective materials

Table 4-1 shows how humidity affects the electrostatic voltage levels generated by different activities.

Table 4-1
Typical Electrostatic Voltage Levels

	Relative Humidity		
Event	**10%**	**40%**	**55%**
Walking across carpet	35,000 V	15,000 V	7,500 V
Walking across vinyl floor	12,000 V	5,000 V	3,000 V
Motions of bench worker	6,000 V	800 V	400 V
Removing DIPS from plastic tube	2,000 V	700 V	400 V
Removing DIPS from vinyl tray	11,500 V	4,000 V	2,000 V
Removing DIPS from Styrofoam	14,500 V	5,000 V	3.500 V
Removing bubble pack from PCB	26,500 V	20,000 V	7,000 V
Packing PCBs in foam-lined box	21,000 V	11,000 V	5,000 V

✎ A product can be degraded by as little as 700 volts.

Table 4-2 lists the shielding protection provided by antistatic bags and floor mats.

Table 4-2
Static-Shielding Materials

Material	Use	Voltage Protection Level
Antistatic plastic	Bags	1,500 V
Carbon-loaded plastic	Floor mats	7,500 V
Metallized laminate	Floor mats	5,000 V

5

Removal and Replacement Procedures

This chapter provides removal and replacement procedures.

Both Phillips P0 and Torx T8 screws are removed during disassembly. There are 25 screws and screwlocks, in five different sizes, that must be removed and replaced when servicing the computer. Make special note of each screw size and location during removal and replacement.

Refer to Appendix C, “Screw Listing,” for detailed information on screw sizes, locations, and usage.

5.1 Serial Number

Report the computer serial number to Compaq when requesting information or ordering spare parts. The serial number is located on the bottom of the computer (Figure 5-1).

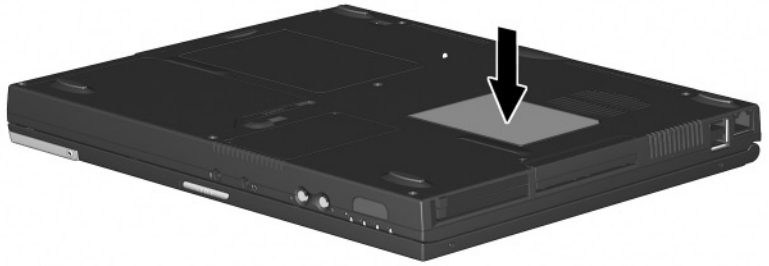


Figure 5-1. Serial Number Location

5.2 Disassembly Sequence Chart

Use the chart below to determine the section number to be referenced when removing computer components.

Table 5-1
Disassembly Sequence Chart

Section	Description	# of Screws Removed
5.3	Preparing the computer for disassembly	0
5.4	Computer feet	0
5.5	Keyboard	1
5.6	Modem/Network Interface Card (NIC)	0
5.7	Real Time Clock (RTC) battery	0
5.8	TouchPad and Touch button	0
5.9	Switch cover	2
5.10	Display	3
5.11	Top cover	10
5.12	System board	5
5.13	Fan	2
5.14	DC-DC converter board	0
5.15	Modem cable	0

5.3 Preparing the Computer for Disassembly

Perform the following steps before disassembling the computer. Consult the computer *Hardware Guide* for instructions on the following steps:

1. Turn off the computer.
2. Disconnect the AC adapter and all external devices.
3. Remove the battery pack.
4. Remove the hard drive.
5. Remove the Media Bay device.

5.4 Computer Feet

The computer feet are adhesive-backed rubber pads. The computer feet are included in the Miscellaneous Plastics Kit (spare part number 241439-001). Refer to Figure 5-2 for computer feet locations.

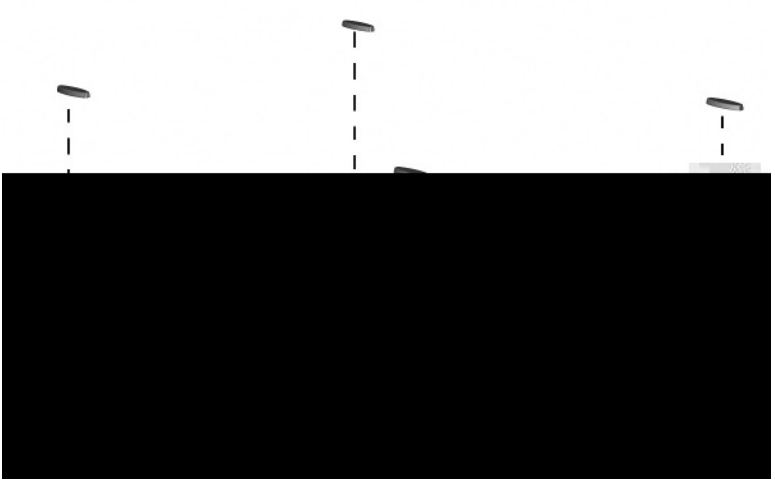


Figure 5-2. Replacing the Computer Feet

6. Slide the four tabs on the top of the keyboard forward ❶ (Figure 5-4).
7. Lift the top edge of the keyboard and swing it up and forward until it rests on the top cover ❷.



Figure 5-4. Releasing the Keyboard

8. Disengage the keyboard cable from the retaining clips in the top cover.

9. Release the ZIF connector to which the pointing device cable is attached ❶ and disconnect the pointing device cable ❷ (Figure 5-5).
10. Release the ZIF connector to which the keyboard cable is attached ❸ and disconnect the keyboard cable ❹.

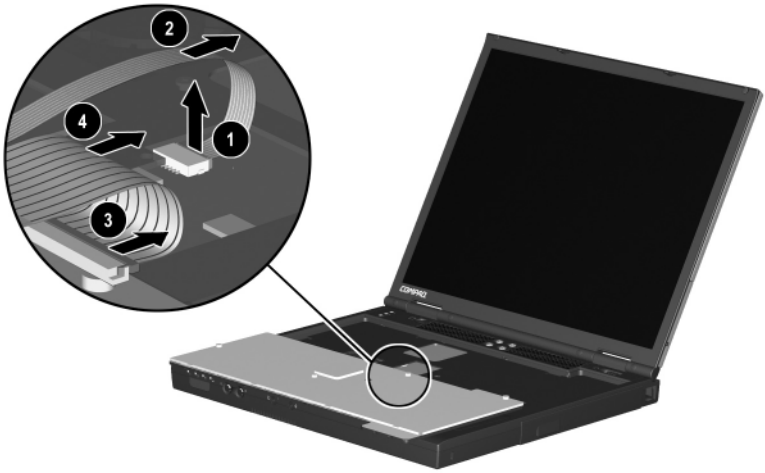


Figure 5-5. Disconnecting the Keyboard and Pointing Device Cables

11. Remove the keyboard.

Reverse the above procedure to replace the keyboard.

5.6 Modem/Network Interface Card (NIC)

Modem/Network Interface Card (NIC) Spare Part Number Information	
Mini PCI communications boards	
Type III mini PCI combination 56-Kbps modem/NIC board	230338-001
Type III mini PCI combination 56-Kbps/NIC/3DES board	230339-001
Type III mini PCI 56-Kbps modem board	230337-001

1. Prepare the computer for disassembly (Section 5.3).
2. Remove the keyboard (Section 5.5).
3. Lift up the left side of the modem/NIC cover ❶ and swing the cover forward ❷ (Figure 5-6).



Figure 5-6. Removing the Modem/NIC Cover

4. Remove the modem/NIC cover.
5. Disconnect the modem/NIC cable from the modem/NIC board ❶ (Figure 5-7).

6. Spread the retaining tabs ❷ that secure the modem/NIC board to the system board. The modem/NIC board rises up at a 45-degree angle.
7. Pull the modem/NIC board away from the connector at a 45-degree angle ❸.

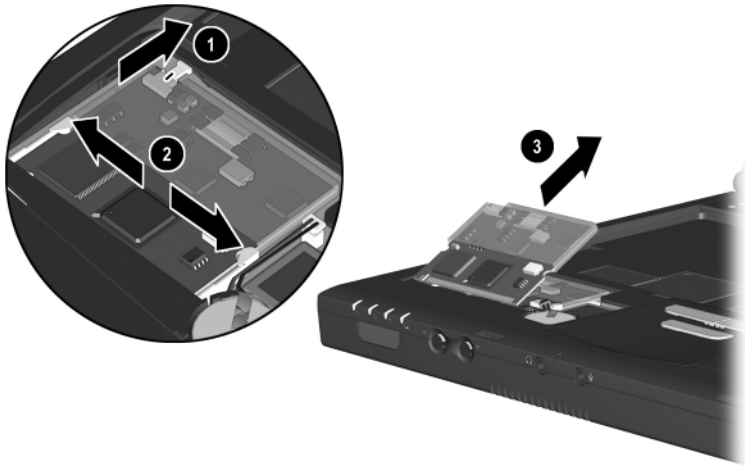


Figure 5-7. Removing the Modem/NIC Board

Reverse the above procedure to replace the modem/NIC board.

5.7 Real Time Clock (RTC) Battery

The RTC battery is included in the Miscellaneous Plastics Kit (spare part number 241439-001).

1. Prepare the computer for disassembly (Section 5.3).
2. Remove the keyboard (Section 5.5).
3. Remove the modem/NIC cover (Section 5.6).
4. Disconnect the RTC battery cable from the system board ❶ (Figure 5-8).
5. Remove the RTC battery from the retaining clip in the top cover ❷.



The system ROM ❸ is also accessible when the modem/NIC cover is removed.

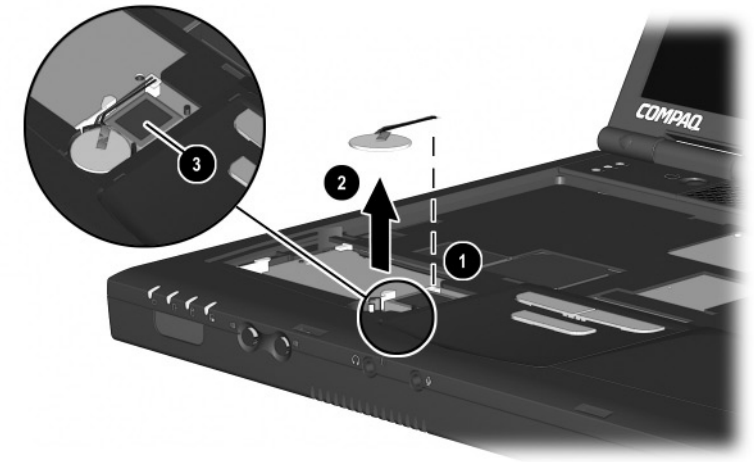


Figure 5-8. Removing the RTC Battery

Reverse the above procedure to replace the RTC battery.

5.8 TouchPad or Touch Button

TouchPad or Touch Button Spare Part Number Information	
TouchPad (for use with TouchPad models)	135227-001
Touch Button (for use with pointing stick models)	159530-001

1. Prepare the computer for disassembly (Section 5.3).
2. Remove the keyboard (Section 5.5).
3. Remove the modem/NIC cover (Section 5.6).

4. Lift up on the left side of the TouchPad ❶ until it disengages from the top cover (Figure 5-9).
5. Swing the TouchPad up and back ❷ and rest it on the top cover.
6. Disconnect the TouchPad cables from the system board ❸.

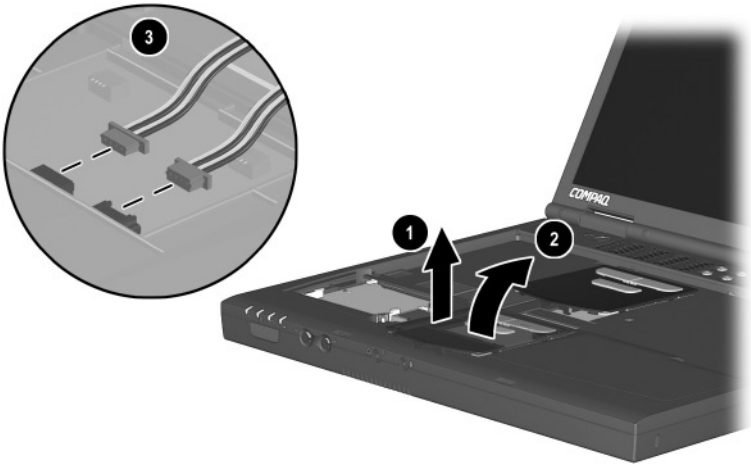


Figure 5-9. Removing the TouchPad

7. Remove the TouchPad.

Reverse the above procedure to replace the TouchPad.

5.9 Switch Cover

Switch Cover Spare Part Number Information	
Switch cover	241438-001

1. Prepare the computer for disassembly (Section 5.3).
2. Remove the keyboard (Section 5.5).
3. Position the computer so the rear panel faces you.
4. Remove the two black M2 × 7 screws that secure the switch cover to the base enclosure (Figure 5-10).



Figure 5-10. Removing the Switch Cover Screws

5. Position the computer so the front faces you.
6. Open the computer as far as it will open.

7. Lift the switch cover up ❶, slide it forward ❷, and rest it on the keyboard (Figure 5-11).
8. Disconnect the left ❸ and right speaker cables ❹ from the system board.

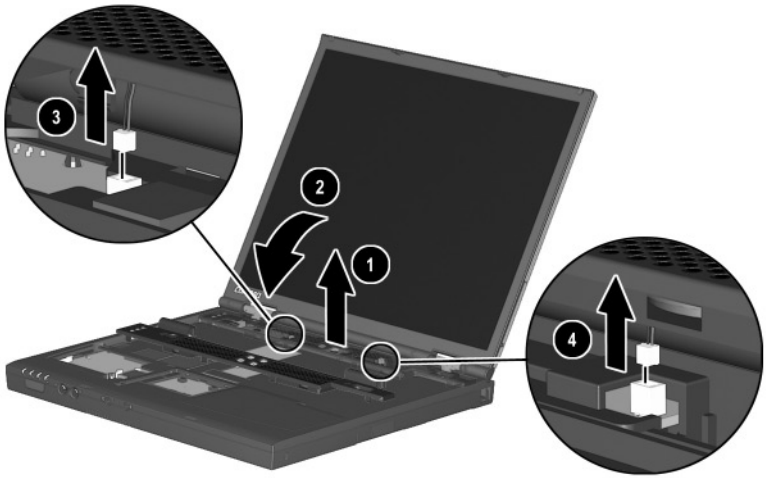


Figure 5-11. Removing the Switch Cover

9. Remove the switch cover.

Reverse the above procedure to replace the switch cover.

5.10 Display

Display Spare Part Number Information	
Displays	
14.1-inch, SXGA+, CTFT	241433-001
14.1-inch, XGA, CTFT	241434-001

1. Prepare the computer for disassembly (Section 5.3).
2. Remove the keyboard (Section 5.5).
3. Remove the switch cover (Section 5.9).
4. Position the display so that it is vertical.

5. Remove the black M2 × 7 screw that secures the display ground cable to the top cover ❶ (Figure 5-12).
6. Disconnect the display video ❷ and inverter cables ❸ from the system board.

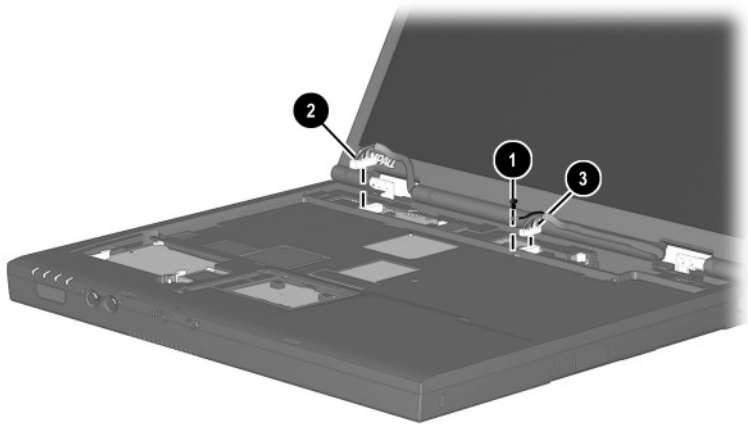


Figure 5-12. Disconnecting the Display Cables

7. Position the computer so the rear panel faces you.

8. Remove the two black M2 × 7 screws ❶ that secure the display to the base enclosure (Figure 5-13).
9. Lift the display straight up and remove it from the base enclosure ❷.

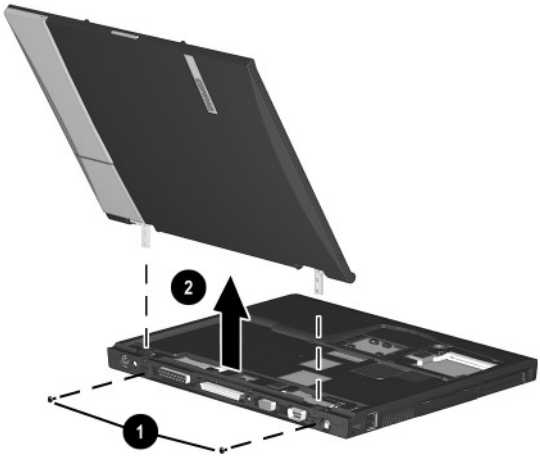


Figure 5-13. Removing the Display

Reverse the above procedure to replace the display.

5.11 Top Cover

Top Cover Spare Part Number Information	
Top cover	241436-001

1. Prepare the computer for disassembly (Section 5.3) and remove the following components:
   a. Keyboard (Section 5.5)
   b. Modem/NIC cover (Section 5.6)
   c. Switch cover (Section 5.9)
   d. Display (Section 5.10)
2. Turn the computer bottom side up with the rear panel facing you.

3. Remove the following screws:
   - ❏ three black M2 × 7 screws from the front edge of the base enclosure ❶ (Figure 5-14)
   - ❏ two black M2 × 5 screws from the hard drive bay ❷
   - ❏ three black M2 × 5 screws from the MultiBay ❸
   - ❏ two black M2 × 5 screws from the rear panel ❹

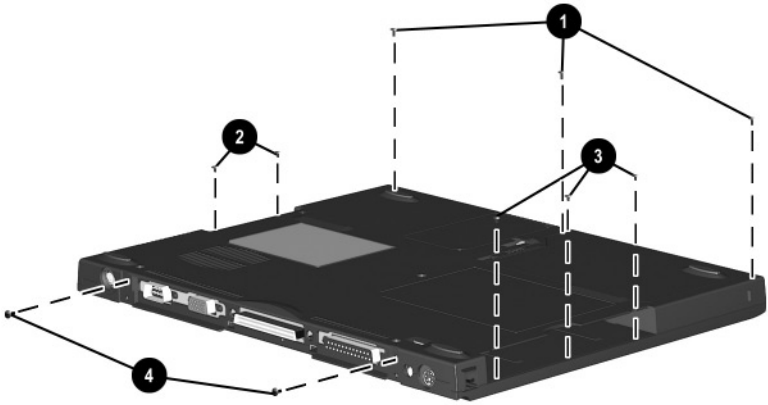


Figure 5-14. Removing the Top Cover Screws

4. Turn the computer top side up with the rear panel facing you.

5. Insert a flat blade screwdriver into the slot ❶ above the docking connector to disengage the top cover from the I/O bracket (Figure 5-15).
6. Lift the top cover straight up and remove it from the base enclosure ❷.

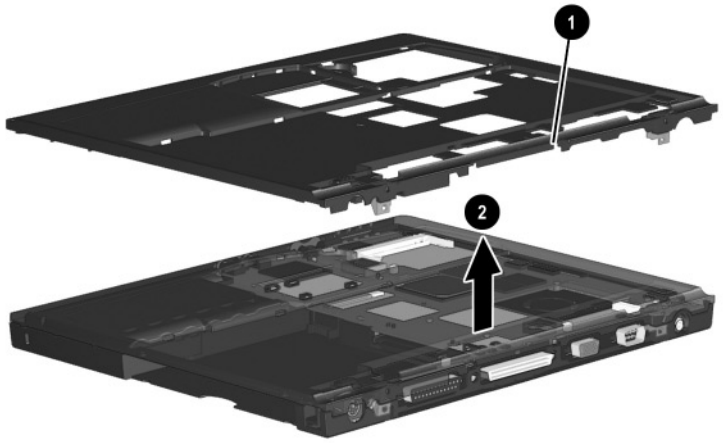


Figure 5-15. Removing the Top Cover

Reverse the above procedure to replace the top cover.

5.12 System Board

System Board Spare Part Number Information	
System boards	
Mobile Intel Pentium III processor 1.066 GHz-M	241430-001
Mobile Intel Pentium III processor 866 MHz-M	241432-001



Make sure the PC Card eject buttons are fully depressed and there are no PC Card devices or space savers inserted into the PC Card slots before removing the system board.

1. Prepare the computer for disassembly (Section 5.3) and remove the following components:
   a. Keyboard (Section 5.5)
   b. Modem/NIC cover (Section 5.6)
   c. RTC battery (Section 5.7)
   d. Touch button assembly (Section 5.8)
   e. Switch cover (Section 5.9)
   f. Display (Section 5.10)
   g. Top cover (Section 5.11)
2. Position the computer so the rear panel faces you.

3. Remove the tape that secures the modem cable to the system board ❶ (Figure 5-16).
4. Remove the two silver 7.0-mm bushing guides ❷ on each side of the docking connector that secure the system board to the base enclosure.
5. Remove the three black M2 × 5 screws ❸ that secure the system board to the base enclosure.

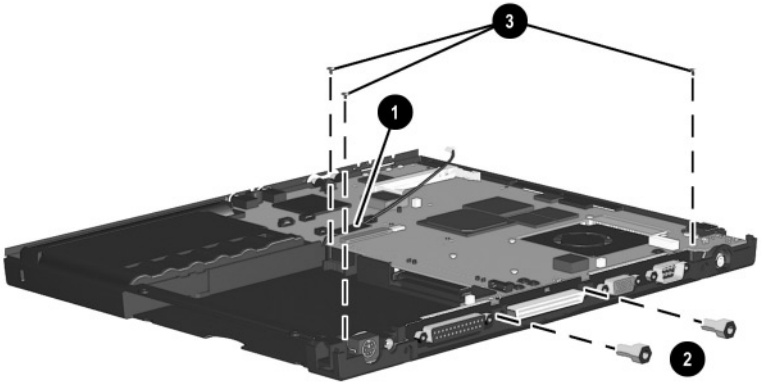


Figure 5-16. Removing the System Board Screws and Screwlocks

When removing the system board, do not remove the following screws (Figure 5-17):

- four screws ❶ that secure the processor bracket to the system board
- two screws ❷ that secure the heat sink to the system board
- two screws ❸ that secure the hard drive connector the system board
- four screws ❹ that secure the PC Card assembly to the system board

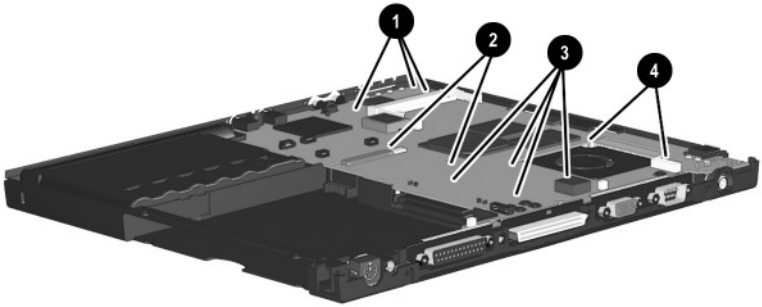


Figure 5-17. Do Not Remove These Screws

6. Use the MultiBay connector ❶ to lift the system board and swing it up and to the right until it rests at a 45-degree angle (Figure 5-18).
7. Slide the system board out of the base enclosure at a 45-degree angle ❷.

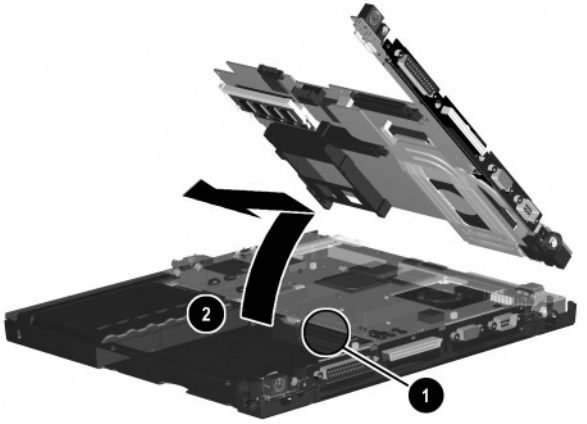


Figure 5-18. Removing the System Board

Reverse the above procedure to replace the system board.

5.13 Fan

Fan Spare Part Number Information	
Fan	255528-001

1. Prepare the computer for disassembly (Section 5.3) and remove the following components:
   a. Keyboard (Section 5.5)
   b. Modem/NIC cover (Section 5.6)
   c. RTC battery (Section 5.7)
   d. Touch button assembly (Section 5.8)
   e. Switch cover (Section 5.9)
   f. Display (Section 5.10)
   g. Top cover (Section 5.11)
   h. System board (Section 5.12)
2. Turn the system board bottom side up with the rear panel facing you.

3. Disconnect the fan cable from the system board (Figure 5-19).

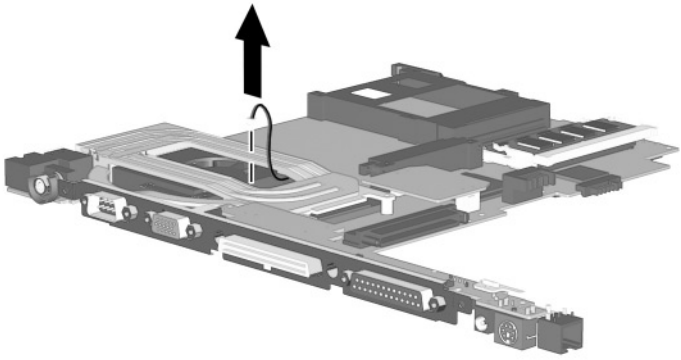


Figure 5-19. Disconnecting the Fan Cable

4. Turn the system board top side up with the rear panel facing you.

5. Remove the black M1 × 6 Phillips screw ❶ and silver M2 × 6.5 Phillips screw ❷ that secure the fan to the system board (Figure 5-20).
6. While holding the system board above the work surface, push the left side of the fan up ❸ from the bottom of the system board.
7. When the left edge of the fan has cleared the system board, slide the fan to the left ❹ and out of the heat sink.

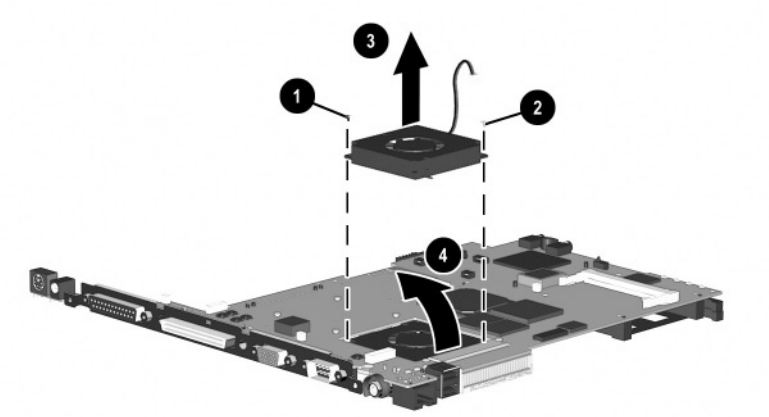


Figure 5-20. Removing the Fan

8. Remove the fan.

Reverse the above procedure to replace the fan.

5.14 DC-DC Converter Board

DC-DC Converter Board Spare Part Number Information	
DC-DC converter board	241435-001

1. Prepare the computer for disassembly (Section 5.3) and remove the following components:
   a. Keyboard (Section 5.5)
   b. Modem/NIC cover (Section 5.6)
   c. RTC battery (Section 5.7)
   d. Touch button assembly (Section 5.8)
   e. Switch cover (Section 5.9)
   f. Display (Section 5.10)
   g. Top cover (Section 5.11)
   h. System board (Section 5.12)
2. Turn the system board bottom side up with the rear panel facing you.

3. Lift the left and right edges of the DC-DC converter board to disconnect the board from the system board (Figure 5-21).

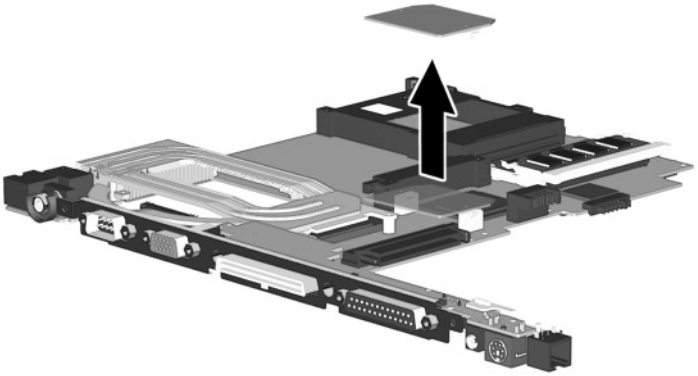


Figure 5-21. Removing the DC-DC Converter Board

4. Remove the DC-DC converter board.

Reverse the above procedure to replace the DC-DC converter board.

When handling the system board, be careful not to put stress on the I/O interface board ❶ (Figure 5-22). The narrow profile of this board makes it susceptible to being damaged when mishandled. Do not remove the screw ❷ that secures the I/O interface board to the system board or attempt to remove the I/O interface board.

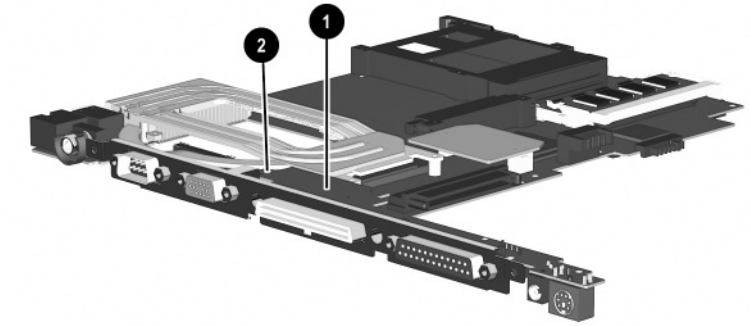


Figure 5-22. Proper Handling of the I/O Interface Board

5.15 Modem Cable



The modem cable is spared with the base enclosure. Modem cables are also included in the Miscellaneous Plastics Kit (spare part number 241439-001).

1. Prepare the computer for disassembly (Section 5.3) and remove the following components:
   a. Keyboard (Section 5.5)
   b. Modem/NIC cover (Section 5.6)
   c. RTC battery (Section 5.7)
   d. Touch button assembly (Section 5.8)
   e. Switch cover (Section 5.9)
   f. Display (Section 5.10)
   g. Top cover (Section 5.11)
   h. System board (Section 5.12)
2. Position the base enclosure with the rear panel facing forward.

3. Lift the modem connector out of the base enclosure ❶ and disengage the modem cable ❷ from the alignment clips and tabs in the base enclosure (Figure 5-23).

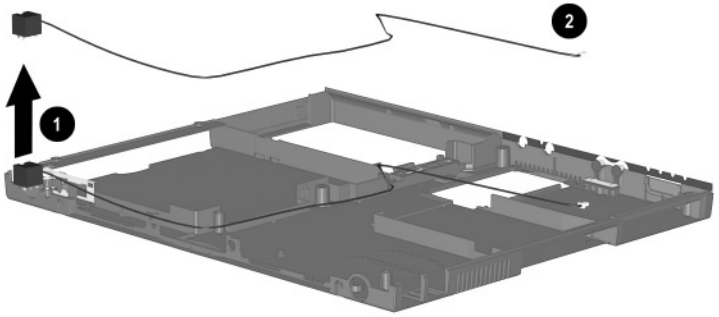


Figure 5-23. Removing the Modem Cable

4. Remove the modem cable.

When installing the modem cable, route the cable along the path indicated in Figure 5-24.

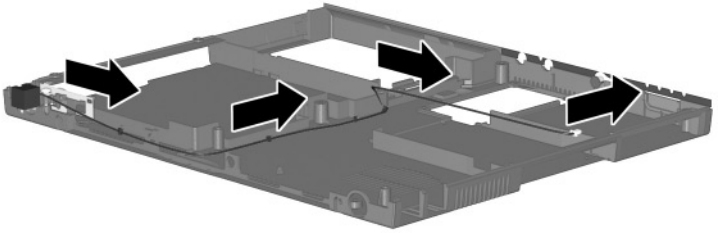


Figure 5-24. Routing the Modem Cable in the Base Enclosure

6

Specifications

This chapter provides physical and performance specifications.

Table 6-1
Computer

Dimensions		
Height	1.2 in	3.1 cm
Width	12.1 in	30.7 cm
Depth	9.8 in	25.0 cm
Weight		
with 8-cell battery pack and optical drive in MultiBay	5.5 lb	2.5 kg
with 8-cell battery pack and MultiBay weight saver	4.8 lb	2.1 kg
Stand alone (Battery) power requirements		
Nominal operating voltage (Li ion)	14.4 V	
Average operating power	15.8 W	
Peak operating power	38 W	
Power in Suspend mode	< 800 mW	
Power in Hibernation mode	< 100 mW	
AC adapter power requirements		
Rated input voltage	90 to 264 VAC (auto switching)	
Rated input current	< 60 W	
Rated frequency	47 to 63 Hz	

Table 6-1
Computer *(Continued)*

Temperature		
Operating	50°F to 95°F	10°C to 35°C
Nonoperating	-4°F to 140°F	-20°C to 60°C
Relative humidity (non-condensing)		
Operating	10 to 90%	
Nonoperating	5 to 95%, 101.6°F/38.7°C maximum wetbulb	
Altitude (unpressurized)		
Operating	0 to 10,000 ft	0 to 3,048 m
Nonoperating	0 to 30,000 ft	0 to 9,144 m
Shock		
Operating	10 G for 11 ms, half sine	
Nonoperating	60 G for 11 ms, half sine	
Vibration		
Operating	0.5 G zero-to-peak, 10-500 Hz, 0.25-oct/min sweep rate	
Nonoperating	1.0 G zero-to-peak, 10-500 Hz, 0.25-oct/min sweep rate	



Applicable product safety standards specify thermal limits for plastic surfaces. The computer operates well within this range of temperatures.

Table 6-2
14.1-inch XGA, TFT Display

Dimensions		
Height	8.46 in	21.40 cm
Depth	11.22 in	28.50 cm
Width	14.10 in	35.81 cm
Number of colors	Up to 16.8 million	
Contrast ratio	150:1	
Brightness	120 nits typical	
Pixel resolution		
Pitch		0.264 × 0.264 mm
Format	1024 × 768	
Configuration	RGB vertical stripe	
Backlight	Edge lit	
Character display	80 × 25	
Refresh	60 Hz	
Total power consumption	4.2 W	

Table 6-3
Hard Drives

	30.0 GB	20.0 GB	15.0 GB
User capacity per drive[1]	30.0 GB	20.0 GB	15.0 GB
Drive height (with drive frame, in mm)	9.5	9.5	9.5
Drive width (with drive frame, in mm)	70.0	70.0	70.0
Interface type	ATA-5	ATA-5	ATA-4
Seek times (typical read, including setting)			
Single track	2.5 ms	2.5 ms	2.5 ms
Average	12.0 ms	12.0 ms	13.0 ms
Full stroke	23.0 ms	23.0 ms	24.0 ms
User addressable sectors[3]	58,605,120	39,070,080	23,579,136
Logical configuration			
Cylinders	22,784	16,383	16,683
Heads	16	16	16
Sectors per track	63	63	63

[1]1 GB = 1,000,000,000 bytes.

[2]System capability may differ.

[3]Actual drive specifications may differ slightly.

Certain restrictions and exclusions apply. Consult the Compaq Customer Support Center for details.

Table 6-3
Hard Drives *(Continued)*

	30.0 GB	20.0 GB	15.0 GB
Physical configuration			
Cylinders[3]	22,784	22,784	25,800
Heads	6	4	2
Sectors per track[3]	293–560	293–560	398–731
Bytes per sector	512	512	512
Buffer size[3]	2 MB	2 MB	512 KB
Disk rotational speed (rpm)	4200	4200	4200
Transfer rate			
Interface max (MB/s)[2]	66.6	66.6	100
Media (Mb/s)[3]	109–203	109–203	155–256

[1]1 GB = 1,000,000,000 bytes.

[2]System capability may differ.

[3]Actual drive specifications may differ slightly.

Certain restrictions and exclusions apply. Consult the Compaq Customer Support Center for details.

Table 6-4
Diskette Drive

Diskette size	3.5 inch	
Light	On system	
Height	0.5 in	12.7 mm
Bytes per sector	512	
Sectors per track		
High density	18 (1.44 MB)	15 (1.2 MB)
Low density	9	
Tracks per side		
High density	80	
Low density	80	
Read/write heads	2	
Average seek times		
Track-to-track (high/low)	3 to 6 ms	
Average (high/low)	94 to 174 ms	
Settling time	15 ms	
Latency average	100 ms	

Table 6-5
CD-ROM Drive

Applicable disk	CD-ROM (Mode 1, 2, and 3) CD-XA ready (Mode 2, Form 1 and 2) CD-I ready (Mode 2, Form 1 and 2) CD-R (read only) CD Plus Photo CD (single/multisession) CD-Extra Video CD CD-WO (fixed packets only) CD-Bridge	
Center hole diameter	.59 in	1.5 cm
Disk diameter		12 cm, 8 cm
Disk thickness		1.2 mm
Track pitch	1.6 µm	
Access time		
Random	< 150 ms	
Full stroke	< 300 ms	
Cache buffer	128 KB	
Data transfer rate		
Sustained, 16X	150 KB/s at 1X	
Variable	1500 to 3600 KB/s (10X to 24X)	
Normal PIO Mode 4 (single burst)	16.66 KB/s	
Startup time	< 8 seconds	
Stop time	< 4 seconds	

Table 6-6
DVD-ROM Drive

Applicable disk	DVD-5, DVD-9, DVD-10 CD-ROM (Mode 1 and 2) CD Digital Audio CD-XA ready (Mode 2, Form 1 and 2) CD-I ready (Mode 2, Form 1 and 2) CD-R (read only) CD Plus Photo CD (single/multisession) CD-Bridge	
Center hole diameter	.59 in	1.5 cm
Disk diameter		12 cm, 8 cm
Disk thickness		1.2 mm
Track pitch	.74 µm	
Access time		
Random	< 150 ms	
Full stroke	< 225 ms	
Audio output level	Line-out, 0.7 Vrms	
Cache buffer	512 KB/sec	
Data transfer rate		
Max 24X CD	3600 KB/s (150 KB/s at 1X CD rate)	
Max 8X DVD	10,800 KB/s (1352 KB/s at 1X DVD rate)	
Normal IO Mode 4 (single burst)	16.6 MB/s	
Startup time	< 12 seconds	
Stop time	< 3 seconds	

Table 6-7
CD-RW Drive

Center hole diameter	.59 in	.39 cm
Disk diameter		12 cm, 8 cm
Disk thickness	.47 in	.12 cm
Track pitch	.74 µm	
Access time		
Random	< 150 ms	
Full stroke	< 225 ms	
Audio output level	Line-out, 0.7 Vrms	
Cache buffer	128 KB/s minimum	
Data transfer rate		
Sustained, 16X	150 KB/s	
Sustained, 4X CD-RW	5,520 KB/s	
Normal PIO Mode 4 (single burst)	16.6 MB/s	
Startup time	< 15 seconds	
Stop time	< 6 seconds	

Table 6-8
AC Adapter

Dimensions		
Height	1.10 in	2.79 cm
Depth	1.42 in	3.61 cm
Width	3.70 in	9.40 cm
Weight	.39 lb	.18 kg
Power supply (input)		
Operating voltage	90 to 260 VAC RMS Nominal	
Operating current	1.3 A RMS	
Operating frequency range	47 to 63 Hz Nominal	
Maximum transient	4/50 kV	

Table 6-9
8-cell, Li ion Battery Pack

Dimensions		
Length	4.95 in	125.80 cm
Width	3.46 in	88.00 cm
Depth	0.80 in	20.40 cm
Weight	0.96 lb	0.43 kg
Energy		
Voltage	14.8 V	
Amp-hour capacity	Minimum 3.7 Ah, typical 3.9 Ah	
Watt-hour capacity	Minimum 53.2 Ah, typical 56.1 Ah	
Temperature		
Operating	32 to 108°F	0 to 42°C
Nonoperating	32 to 140°F	0 to 60°C

Table 6-10
System DMA

Hardware DMA	System Function
DMA0	Available for audio
DMA1	Entertainment audio (default; alternate = DMA0, DMA3, none)
DMA2	Diskette drive
DMA3	ECP parallel port LPT1 (default; alternate = DMA0, none)
DMA4	DMA controller cascading (not available)
DMA5	Available for PC Card
DMA6	Not assigned
DMA7	Not assigned

PC Card controller can use DMA 1, 2, or 5.

Table 6-11
System Interrupts

Hardware IRQ	System Function
IRQ0	System timer
IRQ1	Keyboard controller
IRQ2	Cascaded
IRQ3	COM2
IRQ4	COM1
IRQ5	Audio (default)*
IRQ6	Diskette drive
IRQ7	Parallel port
IRQ8	Real time clock (RTC)
IRQ9	Infrared
IRQ10	System use
IRQ11	System use
IRQ12	Internal point stick or external mouse
IRQ13	Coprocessor (not available to any peripheral)
IRQ14	IDE interface (hard drive and optical drive)
IRQ15	System use

✎ PC Cards may assert IRQ3, IRQ4, IRQ5, IRQ7, IRQ9, IRQ10, IRQ11, or IRQ15. Either the infrared or the serial port may assert IRQ3 or IRQ 4.

*Default configuration; audio possible configurations are IRQ5, IRQ7, IRQ9, IRQ10, or none.

Table 6-12
System I/O Addresses

I/O Address (hex)	**System Function** (shipping configuration)
000 - 00F	DMA controller no. 1
010 - 01F	Unused
020 - 021	Interrupt controller no. 1
022 - 024	Opti chipset configuration registers
025 - 03F	Unused
02E - 02F	87334 “Super IO” configuration for CPU
040 - 05F	Counter/timer registers
044 - 05f	Unused
060	Keyboard controller
061	Port B
062 - 063	Unused
064	Keyboard controller
065 - 06F	Unused
070 - 071	NMI enable/real time clock
072 - 07F	Unused
080 - 08F	DMA page registers
090 - 091	Unused
092	Port A
093 - 09F	Unused
0A0 - 0A1	Interrupt controller no. 2

Table 6-12
System I/O Addresses *(Continued)*

I/O Address (hex)	**System Function** (shipping configuration)
0A2 - 0BF	Unused
0C0 - 0DF	DMA controller no. 2
0E0 - 0EF	Unused
0F0 - 0F1	Coprocessor busy clear/reset
0F2 - 0FF	Unused
100 - 16F	Unused
170 - 177	Secondary fixed disk controller
178 - 1EF	Unused
1F0 - 1F7	Primary fixed disk controller
1F8 - 200	Unused
201	Joystick (decoded in ESS1688)
202 - 21F	Unused
220 - 22F	Entertainment audio
230 - 26D	Unused
26E - 26	Unused
278 - 27F	Unused
280 - 2AB	Unused
2A0 - 2A7	Unused
2A8 - 2E7	Unused
2E8 - 2EF	Reserved serial port

Table 6-12
System I/O Addresses *(Continued)*

I/O Address (hex)	**System Function** (shipping configuration)
2F0 - 2F7	Unused
2F8 - 2FF	Infrared port
300 - 31F	Unused
320 - 36F	Unused
370 - 377	Secondary diskette drive controller
378 - 37F	Parallel port (LPT1/default)
380 - 387	Unused
388 - 38B	FM synthesizer - OPL3
38C - 3AF	Unused
3B0 - 3BB	VGA
3BC - 3BF	Reserved (parallel port/no EPP support)
3C0 - 3DF	VGA
3E0 - 3E1	PC Card controller in CPU
3E2 - 3E3	Unused
3E8 - 3EF	Internal modem
3F0 - 3F7	“A” diskette controller
3F8 - 3FF	Serial port (COM1/default)
CF8 - CFB	PCI configuration index register (PCIDIVO-1)
CFC - CFF	PCI configuration data register (PCIDIVO-1)

Table 6-13
System Memory Map

Size	Memory Address	System Function
640 KB	00000000 - 0009FFFF	Base memory
128 KB	000A0000 - 000BFFFF	Video memory
48 KB	000C0000 - 000CBFFF	Video BIOS
160 KB	000C8000 - 000E7FFF	Unused
64 KB	000E8000 - 000FFFFF	System BIOS
15 MB	00100000 - 00FFFFFF	Extended memory
58 MB	01000000 - 047FFFFF	Super extended memory
58 MB	04800000 - 07FFFFFF	Unused
2 MB	08000000 - 080FFFFF	Video memory (direct access)
4 GB	08200000 - FFFEFFFF	Unused
64 KB	FFFF0000 - FFFFFFFF	System BIOS

A

Connector Pin Assignments

Table A-1
Stereo Speaker/Headphone



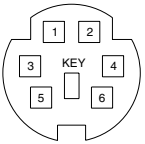
Pin	Signal	Pin	Signal
1	Audio out	2	Ground

Table A-2
Microphone



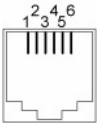
Pin	Signal	Pin	Signal
1	Audio in	2	Ground

Table A-3
Keyboard/Mouse



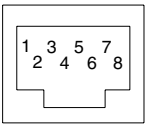
Pin	Signal	Pin	Signal
1	Keyboard/mouse data1	4	+5 VDC
2	Keyboard/mouse data2	5	Keyboard/mouse clock1
3	Ground	6	Keyboard/mouse clock2

Table A-4
RJ-11 Modem



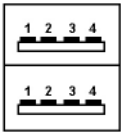
Pin	Signal	Pin	Signal
1	Unused	4	Unused
2	Tip	5	Unused
3	Ring	6	Unused

Table A-5
RJ-45 Network Interface



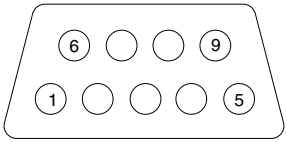
Pin	Signal	Pin	Signal
1	Transmit +	5	Unused
2	Transmit -	6	Receive -
3	Receive +	7	Unused
4	Unused	8	Unused

Table A-6
Universal Serial Bus



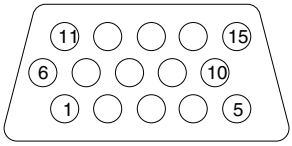
Pin	Signal	Pin	Signal
1	+5 VDC	3	Data +
2	Data -	4	Ground

Table A-7
Serial



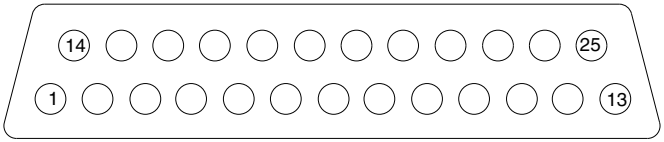
Pin	Signal	Pin	Signal
1	Carrier detect	6	Data set ready
2	Receive data	7	Ready to send
3	Transmit data	8	Clear to send
4	Data terminal ready	9	Ring indicator
5	Signal ground		

Table A-8
External Monitor



Pin	Signal	Pin	Signal
1	Red analog	9	+5 VDC
2	Green analog	10	Ground
3	Blue analog	11	Monitor detect
4	Not connected	12	DDC 2B data
5	Ground	13	Horizontal sync
6	Ground analog	14	Vertical sync
7	Ground analog	15	DDC2B clock
8	Ground analog		

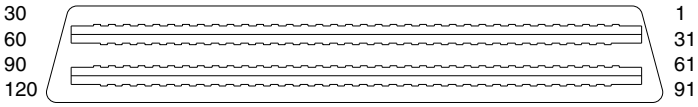
Table A-9
Parallel



Pin	Signal	Pin	Signal
1	Strobe*	10	Acknowledge*
2	Data bit 0	11	Busy
3	Data bit 1	12	Paper out
4	Data bit 2	13	Select
5	Data bit 3	14	Auto line feed*
6	Data bit 4	15	Error*
7	Data bit 5	16	Initialize printer*
8	Data bit 6	17	Select in*
9	Data bit 7	18–25	Signal ground

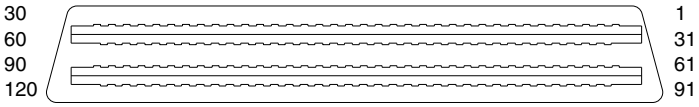
*Signal is active low.

Table A-10
Docking



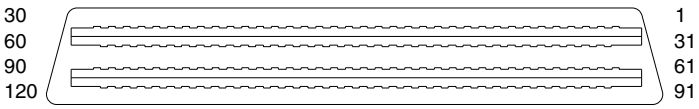
Pin	Signal	Pin	Signal
1	EBOXL	16	RDATA
2	AGND	17	TRK0
3	EBOXS1	18	WDATA
4	RED	19	WGATE
5	AGND	20	STEP
6	GREEN	21	DIR
7	AGRD	22	POWER ON
8	BLUE	23	SYS RESET
9	AGND	24	GND
10	VSYNC	25	DSKCHG
11	HSYNC	26	+5 V (VDD)
12	DDC DAT	27	AUGND
13	DDC CLK	28	XA2/L IN
14	GND	29	XA3/R IN
15	INDEX	30	MID0/MIC IN

Table A-10
Docking (Continued)



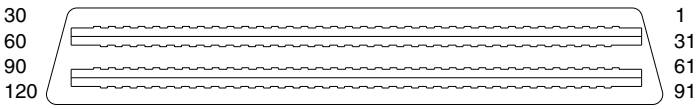
Pin	Signal	Pin	Signal
31	AUGND	46	SRDY
32	XA0/L OUT	47	EBOXS1/GND
33	XSD/MIC SN	48	RI1 EX
34	XA1/R OUT	49	GND
35	GND	50	SLCT LD0
36	GND	51	PE LD1
37	EXPCLK2	52	ACK LD2
38	+3.3 V	53	BUSY LD3
39	EXPCLK0	54	GND
40	+5 V (8051VCC)	55	STRB LD4
41	EXPLCK	56	ALF LD5
42	EBOXS2	57	INIT LD6
43	GND	58	SLCTIN LD7
44	EBOXL	59	GND
45	EBOXL/GND	60	PDATA0 LD8

Table A-10
Docking (Continued)



Pin	Signal	Pin	Signal
61	PDATA1 LD9	76	DRT1 LIIC DAT
62	PDATA2 LD10	77	DSR1 EX
63	PDATA3 LD11	78	DCD1 EX
64	GND	79	12C DATA
65	PDATA4 LD12	80	GND
66	PDATA5 LD13	81	12C CLK
67	PDATA6 LD14	82	GND
68	PDATA7 LD 15	83	HDSEL
69	GND	84	GND
70	ERROR LCLK	85	WPROT
71	RXD1 LVREQ	86	EBOXS2/GND
72	TXD1 LCREQ	87	ERDY
73	RTS1 LEN	88	EBOXL/GND
74	GND	89	FLUSHREQ
75	CTS1 LIIC CLK	90	MEMACK

Table A-10
Docking (Continued)



Pin	Signal	Pin	Signal
91	PS2 VCC	106	GND
92	SERIRQ	107	AD[15]
93	PS2 CLK	108	AD[13]
94	EXPREQ	109	AD[11]
95	AD[29]	110	AD[09]
96	AD[31]	111	GND
97	AD[30]	112	AD[06]
98	AD[28]	113	AD[04]
99	AD[26]	114	AD[02]
100	GND	115	AD[00]
101	AD[24]	116	GND
102	AD[22]	117	FRAME
103	AD[20]	118	TRDY
104	AD[18]	119	STOP
105	AD[16]	120	PAR

B

Power Cord Set Requirements

3-Conductor Power Cord Set

The computer's wide range input feature permits it to operate from any line voltage from 100 to 120 or 220 to 240 volts AC.

The power cord set received with the computer meets the requirements for use in the country where the equipment is purchased.

Power cord sets for use in other countries must meet the requirements of the country where the computer is used. For more information on power cord set requirements, contact a Compaq authorized reseller or service provider.

General Requirements

The requirements listed below are applicable to all countries:

- The length of the power cord set must be at least 5.00 feet (1.5 m) and a maximum of 6.50 feet (2.0 m).
- All power cord sets must be approved by an acceptable accredited agency responsible for evaluation in the country where the power cord set will be used.
- The power cord set must have a minimum current capacity of 10 amps and a nominal voltage rating of 125 or 250 volts AC, as required by each country's power system.
- The appliance coupler must meet the mechanical configuration of an EN 60 320/IEC 320 Standard Sheet C13 connector, for mating with the appliance inlet on the back of the computer.

Country-Specific Requirements

3-Conductor Power Cord Set Requirements

Country	Accredited Agency	Applicable Note Number
Australia	EANSW	1
Austria	OVE	1
Belgium	CEBC	1
Canada	CSA	2
Denmark	DEMKO	1
Finland	FIMKO	1
France	UTE	1
Germany	VDE	1
Italy	IMQ	1
Japan	METI	3
The Netherlands	KEMA	1
Norway	NEMKO	1
Sweden	SEMKO	1
Switzerland	SEV	1
United Kingdom	BSI	1
United States	UL	2

Notes

1. The flexible cord must be <HAR> Type HO5VV-F, 3-conductor, 1.0 mm^2 conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country where it will be used.

2. The flexible cord must be Type SPT-3 or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15A, 125V) or NEMA 6-15P (15A, 250V) configuration.
3. The appliance coupler, flexible cord, and wall plug must bear a “T” mark and registration number in accordance with the Japanese Dentori Law. The flexible cord must be Type VCT or VCTF, 3-conductor, 1.00mm^2 conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7A, 125V) configuration.

C

Screw Listing

This appendix provides specification and reference information for the screws used in the computer. All screws listed in this appendix are available in the Miscellaneous Screw Kit, spare part number 241440-001.

Table C-1
Torx T8 M2 × 7.0 Screw

	Color	Qty	Length	Thread	Head Width
	Black	9	7.0 mm	2 mm	4.0 mm

Where used:

❶ One screw that secures the keyboard to the base enclosure (documented in Section 5.5)

❷ Three screws that secure the top cover to the base enclosure (documented in Section 5.11)

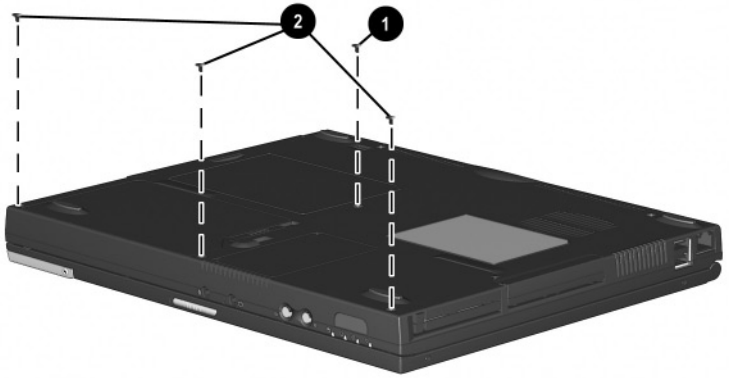


Table C-1
Torx T8 M2 × 7.0 Screw *(Continued)*

	Color	Qty	Length	Thread	Head Width
	Black	9	7.0 mm	2 mm	4.0 mm

Where used:

❶ Two screws that secure the switch cover to the base enclosure (documented in Section 5.9)

❷ Two screws that secure the display to the base enclosure (documented in Section 5.10)

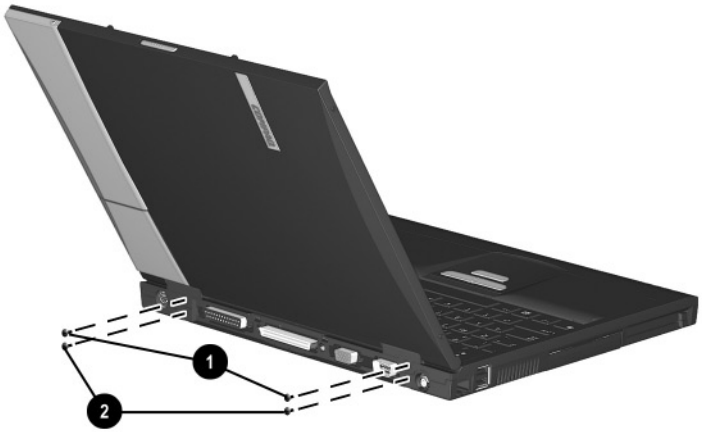


Table C-1
Torx T8 M2 × 7.0 Screw *(Continued)*

	Color	Qty	Length	Thread	Head Width
	Black	9	7.0 mm	2 mm	4.0 mm

Where used:

One screw that secures the display ground cable to the base enclosure (documented in Section 5.10)

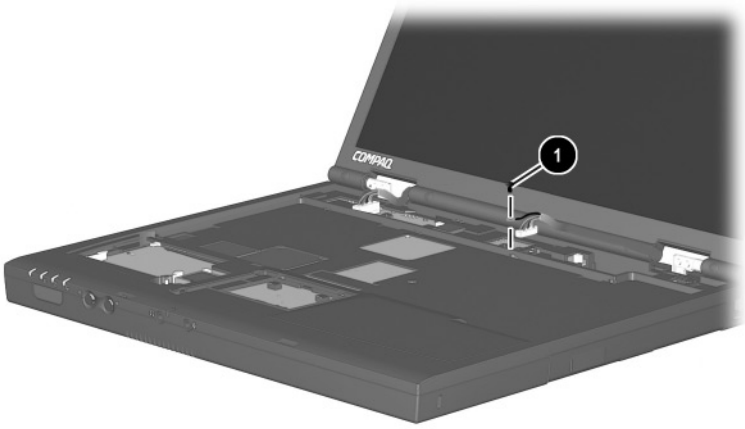


Table C-2
Phillips M1 × 6.0 Screw

	Color	Qty	Length	Thread	Head Width
	Black	1	6.0 mm	1 mm	4.0 mm

Where used:

One screw that secures the fan to the system board (documented in Section 5.13)

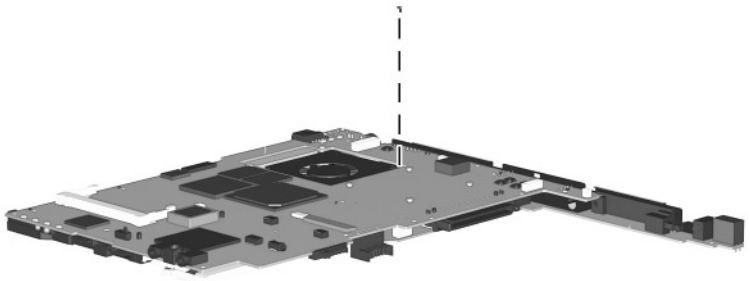


Table C-3
Phillips M2 × 6.5 Screw

	Color	Qty	Length	Thread	Head Width
	Silver	1	6.5 mm	2 mm	4.0 mm

Where used:

One screw that secures the fan to the system board (documented in Section 5.13)

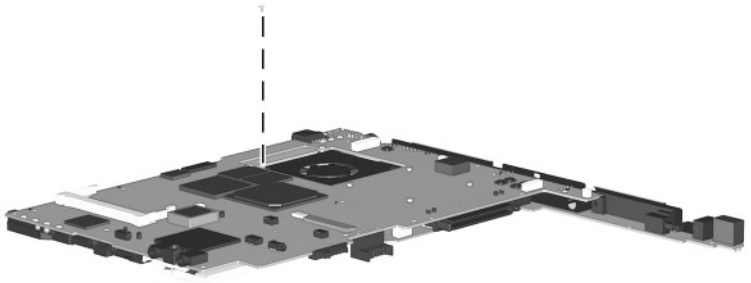


Table C-4
Torx T8 M2 × 5.0 Screw

	Color	Qty	Length	Thread	Head Width
	Silver	12	5.0 mm	2 mm	4.0 mm

Where used:

❶ Two screws that secure the memory expansion compartment cover to the base enclosure (refer to the *Hardware Guide* included with the computer for installation procedure)

❷ Two screws that secure the top cover to the base enclosure (documented in Section 5.11)

❸ Three screws that secure the top cover to the base enclosure (documented in Section 5.11)

❹ Two screws that secure the system board to the base enclosure (documented in Section 5.12)

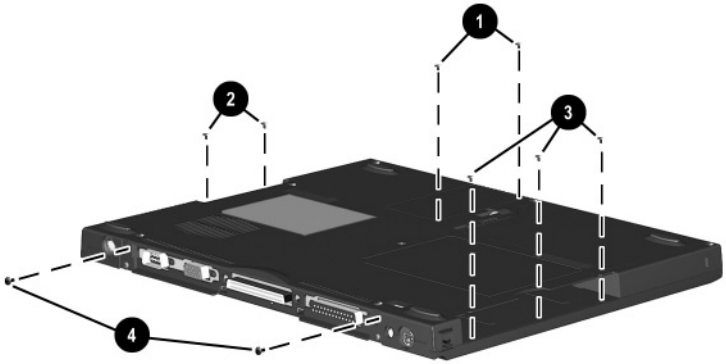


Table C-4
Torx T8 M2 × 5.0 Screw *(Continued)*

	Color	Qty	Length	Thread	Head Width
	Silver	12	5.0 mm	2 mm	4.0 mm

Where used:

Three screws that secure the system board to the base enclosure (documented in Section 5.12)

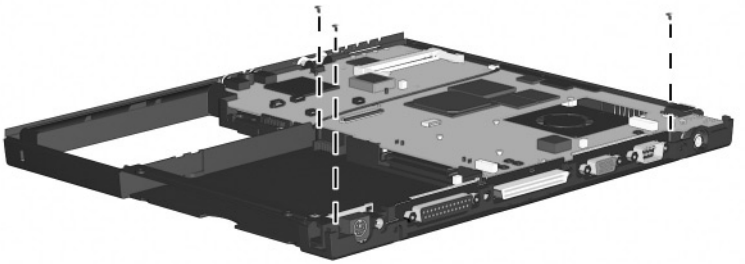
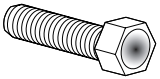


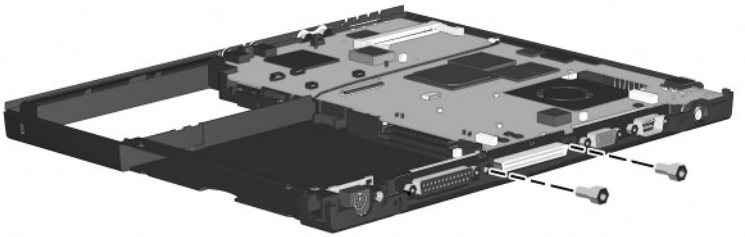
Table C-5
7.0 mm × 20.0 Bushing Guide



Color	Qty	Length	Thread	Head Width
Silver	2	20 mm	n/a	7.0 mm

Where used:

Two bushing guides that secure the system board to the base enclosure (documented in Section 5.12)



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